

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

Volume 19

JUNE, 1936

Number 6

ROCKY MOUNTAIN SPOTTED FEVER IN MINNESOTA*

Report of a Second Indigenous Case and Biologic Studies

HOBART A. REIMANN, M.D.

Minneapolis

RECENT studies have shown that diseases immunologically identical with Rocky Mountain spotted fever occur in many places throughout the world. Within the past few years Boutonneuse Fever of the Mediterranean littoral, Sao Paulo "Typhus" of South America, Eastern Rocky Mountain spotted fever and another mild variety of the disease isolated in Minnesota⁹ have all been found to be immunologically related. It is desirable, therefore, in naming these infections to avoid the implication of geographic restriction by omitting certain limiting adjectives. The term "spotted fever" may be applied to this group of diseases for the sake of simplicity except for the possible confusion which may arise from the designation of typhus fever as "Fleckfieber" (spot-fever) in German and because meningococcus meningitis was once called "spotted fever." Since etiologic terms are preferable to descriptive clinical or anatomic ones in classifying infectious disease, the term "tick fever" or "rickettsial fever" qualified by the variety of rickettsia involved, may eventually prove to be most satisfactory.

The apparent increasing prevalence of spotted fever along the Atlantic seaboard, in Iowa,⁴ Missouri,³ Texas⁵ and other states does not by any means indicate a recent spread of the disease. The studies of Parker,^{6,7,8} and others, have shown that animals, especially rodents, which serve as reservoirs for the infection, and ticks which transmit the infection to man, occur throughout the United States and in parts of Canada. It has been shown, for example, that a

high percentage of ticks collected in Minnesota by Green contain what appears to be spotted fever virus of low-grade virulence.⁸ As in the case of other infectious diseases, spotted fever will probably be found in man in any region favorable to the existence of animal hosts and insect vectors. It is almost a certainty that infections of the spotted fever group have always existed endemically in certain localities and that from time to time man is infected. It appears then that the increase in the recorded number of recognized cases is chiefly due to increasing knowledge of the disease and to recently developed methods of diagnosis. Doubtless many more cases exist than are recognized. Many patients fail to seek medical aid and many mild cases may be wrongly diagnosed or overlooked.

It is highly improbable that the only two cases of spotted fever indigenous to Minnesota should have fallen into the hands of the author. However, aside from a doubtful case mentioned by Fricks in 1914,¹ and of a possible case of typhus fever reported by Head,² in 1915, which in the light of subsequent knowledge may have been spotted fever, no other reports have been found. It is for the purpose of emphasizing the possibility that many unrecognized cases occur in Minnesota that the present discussion and following case report are published.

Case Report

The patient, R. D., a university student, aged twenty-one, was admitted to the hospital on July 5, 1935, complaining of general malaise, anorexia, a "cold" and a rash on the arms, legs, hands and feet. There was

*From the Department of Medicine, University of Minnesota Hospital.

ROCKY MOUNTAIN SPOTTED FEVER—REIMANN

no history of a tickbite, but the patient had visited his home in Blue Earth county sixteen days before the onset of illness.

Present illness.—On July 2 he first noted headache and malaise. There was one diarrheal bowel movement with some abdominal pain which soon disappeared. He thought he had fever and went to bed. The next day slight sore throat and a cough were noted. On July 5, the fourth day of illness, he noted a rash on the palms and backs of his hands, and on the tops and sides of both feet. Typhoid fever was suspected and he was sent to the hospital.

On examination the patient did not appear to be ill. He was bright and alert and had no complaints except malaise and anorexia. His face looked pale in contrast with rather unusually red lips. The conjunctivæ were injected and the tongue coated. Both dorsal and ventral surfaces of the hands and feet, the wrists and ankles, were covered with a maculopapular eruption which varied in shade from a pale pink to a dull rose-pink and faded somewhat on pressure. Some spots were petechial in character. The lesions on the palms were of irregular size and shape, slightly elevated, rose-red, and from 2 to 6 mm. in diameter. They made the hands feel somewhat stiff and sore. The rest of the physical examination was negative except for slight injection of the pharynx. The spleen was not palpable. The temperature was 40.2° C. (104.4° F.) and the pulse-rate 100. The leukocytes numbered 9,000 with 69 per cent polymorphonuclear cells. Because of the characteristic distribution and appearance of the eruption, the conjunctivitis and the season of the year, a tentative diagnosis of spotted fever was made.

Course of the illness.—Except for slight general aching and malaise the patient had no complaints at any time. The day after admission (the fifth day of illness) the eruption spread upward on all extremities and appeared on the abdomen, chest and back. The face was not involved. The eruption then commenced to fade and by the eighth day had nearly disappeared, leaving here and there a faint brownish spot. The temperature reached 40.3° C. (104.6° F.) on the fourth day of illness, but the peak on each succeeding day was lower until it did not rise above normal on the tenth day. The leukocytes on three occasions numbered about 9,000. Agglutinins in the serum for bacilli of the typhoid group, for tularemia and brucelliasis were absent. A blood culture was sterile.

Special procedures.—The blood serum taken on the fifth day contained agglutinins for *B. proteus* X19 (the Weil-Felix reaction) at a titer of 1:100; two days after the temperature returned to normal the titer was still 1:100, but diminished to 1:50, ten days later. The titer was suggestive but was considered too low to be of diagnostic significance. A portion of skin from one of the well developed macules was examined histologically by Dr. Lynch, and showed the usual changes of a mild dermatitis without the endothelial proliferation and necrosis characteristic of spotted fever.

Four guinea pigs were each inoculated intraperitoneally with 4 c.c. of blood, fresh from the patient, on the fifth day of fever. Daily rectal temperature registrations of these animals failed to show any rise above 39.8° during a period of twenty-four days thereafter. On the eleventh day the temperature of one of the animals reached 39.8° C. Blood was immediately withdrawn and inoculated into two fresh animals, neither of which developed fever during eighteen days of observation.

Blood taken from the patient a month after recovery was then sent to Dr. Parker at Hamilton, Montana, and to Dr. McCoy at the National Institute of Health in Washington, for protection tests. Guinea pigs were inoculated with the virus of the eastern variety of spotted fever virus by Dr. Parker and with the Bitter-root variety by Dr. McCoy after the virus in each case had been incubated with the patient's serum. The serum evidently contained no neutralizing power since both sets of inoculated animals developed the disease.

The foregoing tests, therefore, failed to provide confirmation of the clinical diagnosis of spotted fever. As a last resort two of the guinea pigs which had been originally inoculated with the patient's blood were sent to Dr. Parker for immunity tests. The other two animals died from undetermined causes, four weeks after inoculation. It is known that certain guinea pigs are resistant to relatively virulent strains of spotted fever virus and that strains of low virulence may give rise to "inapparent infection," that is, the animals suffer undetectable subclinical infection but at the same time become immunized. The surviving guinea pigs were, therefore, inoculated with virus of the eastern variety of spotted fever, together with two fresh control animals. Both control animals developed high fever on the third day with typical scrotal lesions. Our animals, however, were apparently partially immunized. One showed but two days of fever and the other low-grade fever for eight days; in neither was the scrotum affected, and both recovered. The temperature records are illustrated in Figure 1. This result confirmed the diagnosis and suggested two possibilities: (a) that the patient's blood contained the virus of spotted fever in an amount too small to provoke detectable disease in the guinea pig but large enough to cause immunity, and (b) that the strain of spotted fever present was of low virulence and was similar to the "Minnesota strain" previously studied.⁹

Discussion

It is highly probable that spotted fever is more prevalent in Minnesota than one would be led to believe. The discovery of the virus in ticks substantiates this view. The disease as it occurs here is probably often atypical and caused by a variety of virus of rather low virulence as far as can be determined from studies in guinea pigs. From previous experience there is evidence also that the virulence does not in-

crease by repeated animal passage since no essential changes in the course of infection were noted after the strain had been passed through more than 100 guinea pigs.⁹ This indicated that the strain in question was not an attenuated form of the highly virulent form, but represented a separate type of virus. We had suggested that the Minnesota variety may occupy an intermediate position between the highly virulent Bitterroot strain of spotted fever on the one hand and typhus fever on the other, because of several features possessed in common with both of these diseases in animal tests. Nevertheless, it appeared to be more closely related to the spotted fever group. The question has been more fully discussed by Zinsser.¹⁰ It will be of great interest to determine the nature of the virus causing the infection in adjacent states, which as yet has apparently not been done.

Diagnosis.—In regard to clinical diagnosis it is, of course, necessary to have the disease in mind. It occurs chiefly in the spring and early summer months, when ticks are most active. The history of a tickbite is of great importance, but occasionally is not forthcoming even in proved cases. The sudden onset with the characteristic rash appearing about the third or fourth day, first on the hands, feet, wrists, and ankles, the conjunctivitis and high fever, are cardinal diagnostic features. The leukocyte count is usually slightly elevated and the spleen is occasionally palpable.

A positive diagnosis can best be made by the various procedures mentioned in a preceding paragraph, namely, (a) the Weil-Felix reaction in high titer; (b) inoculation of 5 or 10 c.c. of fresh blood intraperitoneally into guinea pigs followed by fever and scrotal swelling; (c) a Weil-Felix reaction in the blood of inoculated animals which have recovered; (d) the protective or neutralizing power of patients' "convalescent" serum as tested by animal inoculation with known strains; and (e) immunity tests of animals previously inoculated with patient's blood by inoculating them with known strains of virus together with controls.

Previous experience with the Minnesota variety⁹ has shown that the strain is of low virulence for animals, and provokes a low degree of

immunity. These facts must be considered in immunity tests since the Bitterroot strain, and in some cases the Eastern variety, were apparently too virulent to be protected against by the mild local variety. The equivocal results of some of the biologic tests and the absence of pathognostic histologic skin changes in the case

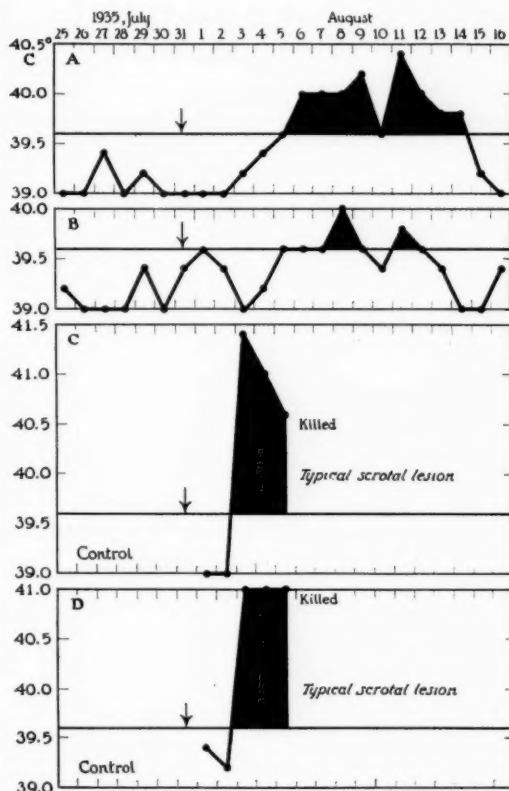


Fig. 1. Results of immunity tests with the eastern variety of spotted fever in guinea pigs. Animals A and B were inoculated with blood from the patient on July 7 but exhibited no evidence of infection. C and D were normal control guinea pigs. Animals A, B, C, and D were inoculated with eastern spotted fever on July 31 by Dr. Parker. C and D developed typical high fever on the third day and typical scrotal lesions. A and B reacted with moderate fever, no scrotal lesions and recovered, indicating that these animals were partially immunized by the previous inoculation of patient's blood and an inapparent infection.

here reported may have been due to the mildness of the infection caused by virus of low virulence as found in Minnesota. It also seems advisable to inject guinea pigs with larger amounts of blood (10 c.c.) from patients suspected of having the disease.

ACUTE CORONARY THROMBOSIS—SMITH AND BRINK

Summary

A case of spotted fever occurred in a young man resident in Minneapolis during the month of July. Certain clinical characteristics typical for spotted fever were present but the illness was exceptionally mild and lasted about ten days. The clinical diagnosis was confirmed by the fact that guinea pigs inoculated with the patient's blood were immunized against infection with a known strain of spotted fever. It is predicted that more cases of spotted fever will be discovered in Minnesota provided the disease is in mind and physicians become alert to this probability.

I wish to acknowledge, with thanks, the coöperation of Dr. Parker, Dr. McCoy and of Dr. Orianna McDaniel in the biologic tests involved in the diagnosis.

Bibliography

1. Fricks, L. D.: Rocky Mountain spotted fever. *Pub. Health Rep.*, 29:449-461, (Feb. 20) 1914.
2. Head, J. D.: A case of typhus fever. *Jour. Am. Med. Assn.*, 64:991, (Mar. 20) 1915.
3. Holdenried, A. R., and Hagebusch, O. E.: Rocky Mountain spotted fever. *Jour. Missouri State Med. Assn.*, 32:199-200, (May) 1935.
4. Jordan, C. F.: Rocky Mountain spotted fever in Iowa. *Jour. Iowa State Med. Soc.*, 25:142-144, (Mar.); 536-539, (Oct.) 1935.
5. Kemp, H. A., and Grigsby, C. M.: The occurrence and identification of an infection of the Rocky Mountain spotted fever type in Texas. *Texas State Jour. Med.*, 27:395-398, (Sept.) 1931.
6. Parker, R. R.: Certain phases of the problem of Rocky Mountain spotted fever. A summary of present information. *Arch. Path.*, 15:398-429, (Mar.) 1935.
7. Parker, R. R.: Rocky Mountain spotted fever. Potentialities of tick transmission in relation to geographical occurrence in the United States. *Am. Jour. Trop. Med.*, 13:341-378, (July) 1933.
8. Parker, R. R.: Rocky Mountain spotted fever. *Northwest Med.*, 34:111-121, (April) 1935.
9. Reimann, H. A., Ulrich, H. L., and Fisher, L. C.: Differential diagnosis between typhus and spotted fever. *Jour. Am. Med. Assn.*, 98:1875-1879, (May 28) 1932.
10. Zinsser, H., Castaneda, M. R., Mooser, H.: Notes on the epidemiology of typhus fever and the possible evolution of the rickettsia disease group. *Tr. Assn. Am. Phys.*, 47: 129-142, 1932.

ACUTE CORONARY THROMBOSIS WITHOUT CHARACTERISTIC PAIN AND WITHOUT SYMPTOMS OF SHOCK

Report of Three Cases

HARRY L. SMITH, M.D., and J. RUSSELL BRINK, M.D.†

Rochester, Minnesota

FOR several years the clinical picture of coronary thrombosis has been so well and so minutely described that a very definite and typical picture and a constant group of symptoms have been accepted as occurring in this condition, but it is only in recent years that severe angina pectoris and coronary sclerosis have been distinguished from acute coronary thrombosis. In most instances these conditions can now be differentiated without difficulty.

One is accustomed to think of the clinical picture of acute coronary thrombosis as a condition affecting a man, usually past forty years of age, who for a year or so has had angina pectoris. While at work or while at rest, or even during sleep, he may suddenly feel a dull or heavy pain under his sternum or in the epigastrium. He usually thinks of this as indigestion, and in the early stages it does have that appearance. This is one reason why in the past the diagnosis of acute coronary thrombosis was most always that of "acute indigestion." The pain persists and

becomes so severe in a few minutes or an hour that the patient becomes frightened, and rightly so, and he feels that he is in a grip with death. This fear of impending death may be very striking, may be almost as distressing as the pain, and it may be depressing for the physician to have to stand by and observe it.

When this feature is extreme, the prognosis is usually very grave. The patient feels sick and nauseated and he may actually vomit. He will break out in a cold sweat in his anguish. The pain keeps relentlessly on, and increases, and it may become unbearable.¹ It may extend through to the patient's back and up into the neck along the great vessels; it often extends down one or both arms. The patient will often state that he has a sense of constriction; he feels as if he is being squeezed in a vise. He becomes more anxious and his agony increases. He may be unable to keep quiet and he often will turn restlessly in bed or get up and pace the floor. If he does not succumb to the attack, the pain usually will begin to abate after one, two, or more hours. Usually the pain is so severe that some

†Dr. H. L. Smith is with the Section on Cardiology, The Mayo Clinic, and Dr. J. R. Brink is a Fellow in Medicine, The Mayo Foundation, Rochester, Minnesota.

medicine has been given for relief, usually morphine. As a rule, the patient is quite dyspneic. This feature may vary considerably, from slight to very severe dyspnea; the patient may actually struggle to get his breath.

On physical examination one of the first things noticed is the extreme distress and the fact that the patient is dangerously ill. He is usually white and pale, restless, and bathed in a cold sweat. His first complaint will be of pain, and second, shortness of breath. Listening to the heart does not often indicate the grave nature of the attack. Often the pulse is regular and only moderately increased in rate. The blood pressure will be very low, and often one is not able to ascertain the diastolic pressure. The picture is one of extreme shock. A ruptured upper abdominal viscus will often give practically an identical picture.

Lately we have become so accustomed when we think of acute coronary thrombosis to picture in our minds the foregoing description, that we fail to recognize the mild attacks, or the cases that do not present this typical picture.

We are presenting three cases in which the symptoms were very mild. They did not have the characteristic pain or symptoms of shock, and if it had not been for the aid of the electrocardiogram, we doubt if a correct diagnosis could have been made.

Report of Cases

Case 1.—A business man, sixty-five years of age, came to the clinic complaining of attacks of substernal pain for the previous ten days; these attacks had not always been brought on by exertion. Pain was projected down the inner side of both arms, the attacks lasting only a few minutes. At 10 a. m. of the day of admission he had had an attack while walking and he had had to remain quiet for a few minutes. He had broken out into a sweat and his fingers had become numb and white. In a short while he had been able to return to his work again. A dull, aching pain with a few sharp pains in the chest had remained, however, and in the afternoon he walked to the clinic for examination. His past history was essentially negative except for appendectomy for acute appendicitis in July, 1935. There was no family history of heart trouble.

On examination the patient did not appear to be ill. There was no cyanosis, dyspnea, or increased perspiration. The pulse rate was 68 beats per minute and respirations 18 per minute; the temperature was 97.8° F. The heart tones were regular and of fair quality. On percussion there was no demonstrable enlargement of the area of cardiac dullness. The blood pressure was found to be 138 mm. of mercury systolic and 80

diastolic. The lungs were negative to percussion and auscultation. The liver was not palpable nor was there any peripheral edema.

An electrocardiogram taken at 4 p. m., six hours

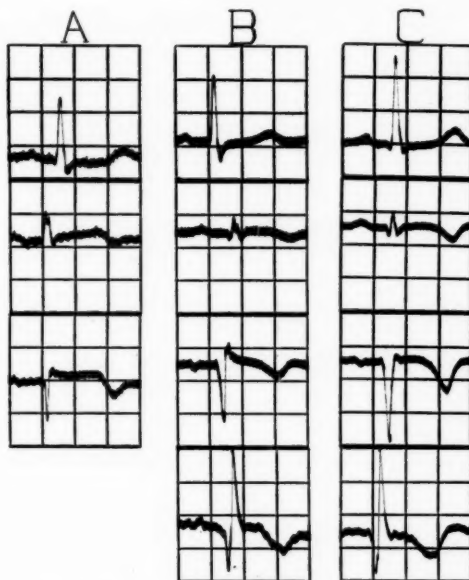


Fig. 1 (Case 1) *A*, Six hours after acute coronary thrombosis: the T wave in derivation II is diphasic and is inverted in derivation III; the R-T segment is depressed in derivation I and elevated in derivations II and III, and the Q wave in derivation III is lengthened; *B*, standard and fourth leads taken two days after acute coronary thrombosis; in addition to what is shown in *A*, the T wave in derivation II is inverted and the changes in the R-T segments are more pronounced, the fourth lead showing inversion of the T wave, and *C*, standard and fourth leads taken four days after acute coronary thrombosis; there is no decided change from *B*, and the R-T takeoff in the third lead is not quite as high in *C* as in *B*.

after the attack of substernal pain (Fig. 1), disclosed diphasic T waves in derivation II and inverted T waves in derivation III. There was depression of the R-T segment in derivation I, elevation of the R-T segment in derivations II and III, and a lengthened Q wave in derivation III. An electrocardiogram taken the following day showed, in addition, inverted T waves in derivation II and a change in the contour of the S-T segments in derivation III. The Q_3 and T_3 patterns in the electrocardiogram were characteristic of acute infarction involving the posterior basal portion of the left ventricle.

On admission to the hospital the same evening the leukocyte count was 9,600 per cubic millimeter of blood, and on the next three successive days was 7,000, 9,200, and 9,700 cells per cubic millimeter respectively. On the second and third days in the hospital the patient had a temperature of 100.8° F. There was no significant change in the blood pressure at any time and convalescence was uneventful.

Case 2.—A civil engineer, aged 60, came to the clinic complaining of an intermittent "burning pain" in the

ACUTE CORONARY THROMBOSIS—SMITH AND BRINK

back of his neck of about ten years' duration. Physical activity would often bring on this pain and, if this were moderated, relief often would follow. The relation of the pain to exertion was not constant, however, and

to the clinic complaining of attacks of precordial pain of one to three minutes' duration with projection into the shoulders and neck. He had had these attacks daily for the previous week; none of them had been related

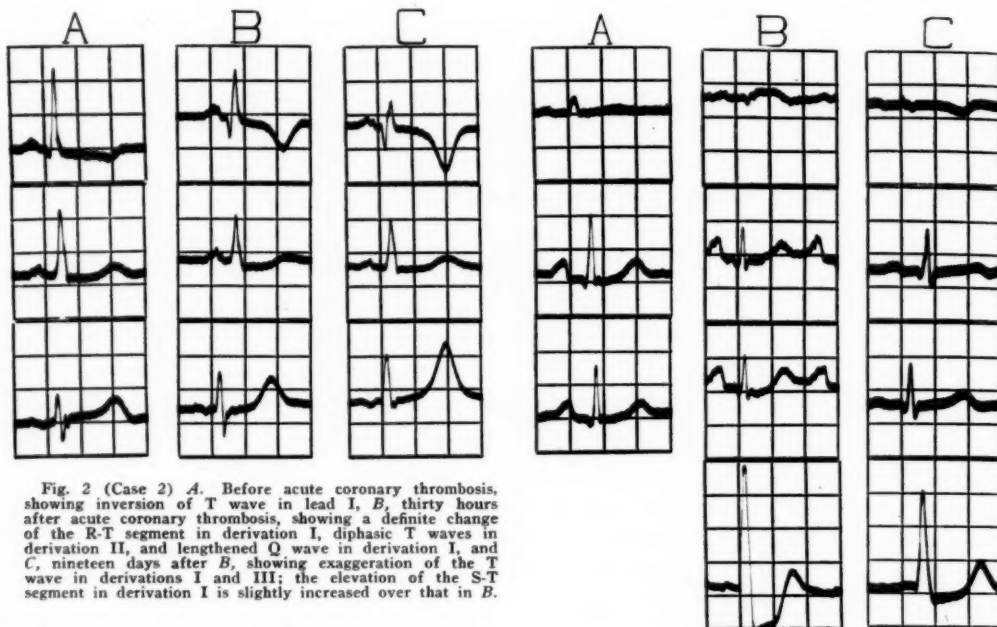


Fig. 2 (Case 2) *A*, Before acute coronary thrombosis, showing inversion of T wave in lead I, *B*, thirty hours after acute coronary thrombosis, showing a definite change of the R-T segment in derivation I, diphasic T waves in derivation II, and lengthened Q wave in derivation I, and *C*, nineteen days after *B*, showing exaggeration of the T wave in derivations I and III; the elevation of the S-T segment in derivation I is slightly increased over that in *B*.

the pain was not projected to the arms. Because his brother had recently died of "angina pectoris," he was much concerned about his condition. On the morning after admission to the clinic he had a similar attack of pain after "setting up" exercises, with projection of the pain to the upper part of the sternum but none down either arm. He had not perspired nor had he had a sense of impending doom with this.

On examination the patient did not appear acutely ill. There was no dyspnea, cyanosis, or signs of shock. The pulse rate was 60 beats per minute and the heart tones were of good quality. No arrhythmia was present. The blood pressure was found to be 180 mm. of mercury systolic and 100 mm. diastolic. Examination of the thorax was negative. Roentgenograms of the cervical and thoracic spinal column revealed rather marked hypertrophic changes. The electrocardiogram showed left ventricular preponderance and inverted T waves in derivation I (Fig. 2).

The patient was sent to the hospital for further observation and study. On the first day his temperature rose to 99.8° F. and the leukocyte count was 13,100 per cubic millimeter of blood. A second electrocardiogram disclosed a definite change in contour of the R-T segment in derivation I and diphasic T waves in derivation II. Subsequent electrocardiograms also revealed lengthened Q waves in derivation I and exaggerated T waves in derivations I and III. The patient's course in the hospital was uneventful.

Case 3.—A white man, fifty-seven years of age, came

Fig. 3 (Case 3) *A*, Four months before acute coronary thrombosis; other than a low amplitude in derivation I, this electrocardiogram is essentially normal; *B*, standard and fourth leads taken twenty-four hours after acute coronary thrombosis, showing an inverted T wave in derivation I, with elevation of the S-T segment in derivation I and depression of the R-T segment in derivation III; the T wave in derivation IV is positive, and *C*, standard and fourth leads taken fourteen days after *B*; the changes in *C* are practically the same as in *B*.

to physical exertion, but a few had come on during excitement. Six months previously the patient had come to the clinic because of a similar attack, and at that time the examination and electrocardiogram had been negative. From that time until this present series of attacks, he had experienced no distress in his chest. The attack the day before admission had left a soreness in the epigastrium for several hours. He had had no perspiration, weakness, or dyspnea with the attack. Except for right herniotomy in 1926 and right ureterolithotomy in 1932, his history was essentially negative. His mother had died of heart disease at an old age. The family history otherwise was negative.

On examination the patient appeared to be comfortable and did not seem to be having any pain. There was no dyspnea, cyanosis, or increased perspiration. The respirations were 20 per minute, the pulse rate 120 beats per minute, and the blood pressure 180 mm. of mercury systolic and 110 mm. diastolic. Examination of the lungs was negative. The heart tones were of good quality and examination of the heart gave essentially negative results. On abdominal examination

the liver was not palpable. The electrocardiogram revealed an inverted T wave in derivation I with a change of contour of the R-T segment in this derivation. There was elevation of the R-T segment in derivation I and depression of the R-T segment in derivation III. The T wave in derivation IV, taken by the Wolferth method, was positive. Subsequent electrocardiograms revealed similar changes (Fig. 3).

During his first day in the hospital the patient's temperature was 100.2° F. and the leukocyte count was 13,900 per cubic millimeter. In the next four days the leukocyte count dropped to 7,500 per cubic millimeter. The patient's course in the hospital was uneventful.

Comment

These cases are of interest because, clinically, they did not present the picture usually seen in cases of acute coronary occlusion and it was impossible to establish the diagnosis positively the first day. The diagnosis was not established until

after the patients had been hospitalized and studied for a day or so. The diagnosis could easily have been missed or passed as that of angina pectoris with coronary sclerosis.

When one considers the wide variation in the pathologic process in these cases, that is, the variation from occlusion of a very small branch—not complete occlusion at all but extreme narrowing of the coronary artery, with resultant small myocardial infarction—to complete sudden occlusion of one of the coronary arteries or one of its main branches, with resulting large infarction, it is not difficult to explain why there is such a variation in the clinical picture.

Bibliography

1. Parkinson, John: Coronary thrombosis. *Brit. Med. Jour.*, 2:549-553, (Sept. 17) 1932.

THE AMBULATORY TREATMENT OF AURICULAR FIBRILLATION WITH QUINIDINE*

A Five-Year Follow-Up Study

S. A. WEISMAN, M.D.

Minneapolis

QUINIDINE is, perhaps, finally reaching the place it deserves as a therapeutic measure in the treatment of heart disease. Much has been written for and against its use in the treatment of cardiac disease since the drug was introduced by Frey³ in 1918. As early as 1922 Robert Levy¹¹ concluded after a study on fifty cases of auricular fibrillation "that the danger of emboli accidents after quinidine has been given undue emphasis." Then in 1923 Viko, Marvin, and White¹⁷ concluded that the danger of accidents with quinidine is not much greater than with any other form of treatment. Again in 1923 Korns⁹ asks whether the cases of embolism from use of quinidine in auricular fibrillation are more frequent than those which commonly occur in fibrillation treated with digitalis or is it that we hear more of them by reason of the prominence of quinidine in the medical literature. It has been known for some time, as shown by MacKenzie,¹³ that cerebral emboli occur in cases of auricular fibrillation treated with

digitalis. Emboli have been known to occur in individuals with auricular fibrillation who have had no treatment whatsoever.

Recently a middle aged woman who had mitral stenosis and auricular fibrillation came to the clinic. After she was told of her condition she asked if her local physician could treat her. She was referred back to her own physician, who gave her only digitalis. She was on this treatment for several weeks. She appeared again at the clinic, this time with an additional complaint. She had a severe pain in the calf of her left leg. Examination disclosed an embolus in the posterior tibialis artery. Had she been on quinidine no doubt the drug would have been blamed for the accident.

Morowitz and Hochrein¹⁴ in 1927 began using quinidine as a prophylactic measure to prevent fibrillation and acute heart failure in decompensated hearts. Since adopting this measure their results, they say, have been better. Levine¹⁰ in 1932, experimenting on cats, found that quinidine raises the threshold for ventricular fibrillation by faradic stimulation threefold, from 0.20

*From the Department of Cardiology, University of Minnesota Medical School. Read before the Southern Minnesota Medical Association, Austin, Minn., August 26, 1935.

AURICULAR FIBRILLATION—WEISMAN

TABLE I

Etiology	Name	Age	Duration of fibrillation	Duration of regular rhythm
Rheumatism	Mr. B.	31	1 year	1 month
	Mr. O'B.	69	3 years	4 months
	Mrs. H.	37	9 months	7 days
	Mrs. M.*	46	3 years	4 years
	Average	46		Average 13¼ months
Coronary disease and hypertension	Mrs. G.*	62	2 years	5 years
	Mr. L.	59	1 month	0-9 months
	Mr. F.	74	Several months	1-6 months
	Mr. S.	61	8 months	1-7 months
	Mr. W.	66	3 years	0-3 months
	Mr. A.	73	3 years	0-3 months
	Mrs. M.	62	2 years	0-3 months
	Mr. Os.	66	10 months	1 month
	Mr. Or.*	53	6 months	4 years
	Mr. P.*	67	9 months	4 years
	Average	64.3		Average 26 months
Diabetes and hypertension	Mrs. H.	70	Over 10 years	9 months (can't trace)
Lues and aortitis	Mr. McK.	62	3 years	4 months
No apparent heart disease	Mr. B.*	73	2 days	5 years

*Still regular as of May, 1935.

amperes before giving quinidine to 0.60 after administration of the drug. He suggests the use of quinidine in those conditions in which fibrillation is prone to occur. Recently Nathanson,¹⁵ working on humans, has shown that quinidine taken by mouth may prevent increased ventricular rhythmicity (the basis for ventricular fibrillation) and advocates its use in cases of angina pectoris showing evidence of ventricular irregularities.

In 1930 it was the writer's opinion that the dangers attributed to the use of quinidine had

probably been over-emphasized and that a trial of the use of the drug in ambulatory patients of auricular fibrillation was perhaps justified. Twenty-four unselected cases of auricular fibrillation from the outpatient department of the cardiac clinic at the University of Minnesota were treated. Seventeen, or 70 per cent, were restored to normal rhythm.¹⁸

It is the purpose of this study to give a five-year follow-up report on the seventeen cases that were restored to normal rhythm.

Duration of Restored Normal Rhythm

Table I and Graph I give a five-year follow-up study on the duration of restored normal rhythm in the seventeen successfully treated patients. It will be observed that five, or over 20 per cent of the original twenty-four patients treated, are still regular. One has been regular now for five years, and four have been regular for four years; and every one of these five patients is active and carrying on with his daily duties.

The average age of the rheumatic group was about forty-six years, about eighteen years younger than the coronary and hypertension group. The average duration of normal rhythm of the rheumatic group was about thirteen months, or about 50 per cent of that of the hypertension and coronary group. The average duration of restored rhythm in the hypertension

GRAPH I. DURATION OF RESTORED NORMAL RHYTHM

	1 yr.	2 yrs.	3 yrs.	4 yrs.	5 yrs.
Mr. Os.	1 yr.				
*Mr. Or.	4 yrs.				
Mr. McK.	9 mos.				
Mr. B.	1 mo.				
Mrs. H.	4 mos.				
Mrs. W.	3 yrs.				
Mr. O'B.	3 mos.				
Mr. A.	4 mos.				
Mr. S.	3 mos.				
Mr. F.	1 yr.				
Mr. L.	7 mos.				
*Mr. H.	1 yr.				
*Mrs. H.	4 yrs.				
*Mrs. G.	5 yrs.				
Mr. P.	9 mos.				
*Mr. B.	4 yrs.				

*Still regular as of May, 1935.

AURICULAR FIBRILLATION—WEISMAN

and coronary group was about twenty-six often attributed to the drug is that the primary months. (first) doses usually advocated are too large.

It has been our experience, like that of Jame- If given carefully a patient rarely complains of

TABLE II

Name	Etiology	Age	Duration of fibrillation	Regular
Mr. Or.	Coronary	57	6 months	4 years
Mr. B.	No apparent heart disease	77	2 days	4 years
Mrs. M.	Rheumatic	50	3 years	4 years
Mr. P.	Hypertension and coronary	71	9 months	4 years
Mrs. G.	Hypertension and coronary	67	2 years	5 years

son,⁶ Hay,⁴ Clark-Kennedy,¹ Kohn and Levine,⁸ that fibrillation due to rheumatic disease is much more difficult to restore to normal rhythm and maintain normal than the other types. The hypertension and coronary patients respond quite readily to quinidine therapy and are apt to maintain a normal rhythm for longer periods.

Table II gives a résumé of the five patients who are still regular. It gives the etiology, present age, and duration of the auricular fibrillation. Every patient is fifty years of age or over. The average age of the group is over sixty-four.

These patients have been kept under constant observation and are on maintenance doses of quinidine. There have been times when Mrs. M., Mr. P., and Mr. Or. have become irregular, temporarily, when out of medicine; but they were always readily restored to normal rhythm by resuming the use of quinidine. Perhaps the chief reason why patients with auricular fibrillation who have been restored to normal rhythm sooner or later begin to fibrillate again is that they do not continue the regular maintenance doses of quinidine. They usually feel so well that they begin to get careless, thinking that they do not need to continue taking medicine. Then, sooner or later, fibrillation returns. It is very important that a maintenance dose of quinidine be taken daily. If this entire series of seventeen patients could have been kept under better supervision there no doubt would have been more than five still regular.

Method of Treatment

The method of treatment, I believe, is very important. Two things should be remembered: (1) that the dose to begin with should be very small; and (2) that the quinidine should be given at short intervals of time, not over two hours apart.

The reason, perhaps, for the toxic effects so

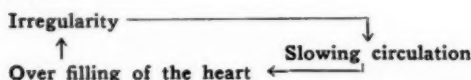
any gastric disturbances or nausea, or experiences any cardiac effects. The following procedure I have found effective. First digitalize the patient, slowing the pulse down to 70-80. Then start the quinidine, continuing a maintenance dose of digitalis. The first day give the patient one dose of 1.5 grains (0.1 gm.); the next day give him 1.5 grains (0.1 gm.) at 8 a. m. and another at 9 a. m.; the next day 1.5 grains (0.1 gm.) each hour for three doses; the following day the same dose four times; then increase the dose to 3 grains (0.2 gm.) each hour for three doses; the following day 3 grains each hour for four doses. Then give 5 grains (0.33 gm.) at 8, 9, and 10 a. m.; the next day 5 grains (0.33 gm.) for four doses. Then you increase the dose more rapidly, to 10 grains (0.67 gm.) each hour for three doses. I usually find that if the fibrillation is not restored to normal rhythm after giving 30 grains (2.0 gm.) of quinidine daily for a few days the heart will not maintain a normal rhythm for a very long period even if it is restored to normal rhythm by larger doses.

By using the small dose method, the patient develops a tolerance for the drug and very rarely experiences any toxic effects. The reason for giving quinidine at one or two hour intervals is that at the end of an hour the drug is practically eliminated from the blood stream¹⁹ and when given at intervals of four to six hours the drug is not used to the best advantage. Larger doses have to be given each time to get the desired results, and in so doing the danger of toxic effects is much more possible.

After the heart is restored to normal rhythm the same dose of quinidine should be maintained for a few days only. After that time the doses should be diminished each day, 5 grains or so a day, until a maintenance dose is established. My experience has been that about 10 grains

is the average amount of quinidine, taken daily (given in two 5-grain doses one hour apart), that will maintain a normal rhythm. In some cases I give 10 grains one day alternating with 5 grains the next. Some can maintain a normal rhythm on only 5 grains daily. Each case must be studied independently.

A question often brought forth is, are these patients afflicted with auricular fibrillation any better off after the heart is restored to normal rhythm than they were with a slow fibrillating heart under control of digitalis. Might one not as well ask, is an engine whose efficiency can be increased 20-30 per cent any better for the running power of a motor car? It is quite evident that a manufacturer of automobiles, or any other motor device, would consider such an increase in power a most remarkable engineering feat. That is just exactly what happens when a fibrillating heart is restored to normal rhythm. In 1920 Eyster and Swarthout,² experimenting on dogs, showed that the cardiac output in a fibrillating heart was diminished 15-79 per cent. Later Lewis,¹² working on dogs and cats, demonstrated that the minute volume of a fibrillating heart decreased about 20 per cent. Then, in 1930, Smith, Walker, and Alt¹⁶ showed that the minute volume increased about 30 per cent when normal rhythm was established in fibrillating hearts that had previously been treated with digitalis. In our clinic, Kerkhof's⁷ studies on nine cases of mitral stenosis with auricular fibrillation resulted in similar findings. Some of the patients were decompensated. These patients were treated with digitalis until well compensated and until the ventricular rate was between 60 and 70. After these patients were restored to normal rhythm by the use of quinidine, he found that the average minute volume increased 30 per cent. Some time ago Hirschfelder⁵ emphasized that point, saying "the mechanical effect of any arrhythmia is to slow the circulation. This leads to an increased pressure in the veins and upon a cardiac muscle whose tone is diminished, establishing a 'vicious circle.'"



These five cases that I have mentioned as still being regular, with the exception of Mr. B., whose heart was irregular only a few days

before being restored to normal rhythm, were chronic cardiac invalids. They could not carry on with their daily duties. They have become useful citizens during the past four or five years. Needless to say these patients are very happy and most grateful. The reason is evident; they are no more heart conscious; they do not feel that palpitation and irregular beating; their cardiac efficiency has increased about 30 per cent, which is a considerable gain. Their tolerance for carrying on has increased considerably, they are again useful, independent, and self supporting citizens.

Conclusions

1. A five-year follow-up study on the ambulatory treatment of auricular fibrillation is presented.
2. Quinidine is a valuable drug in the treatment of auricular fibrillation.
3. It is important that the drug be given in small doses to begin with, and at short intervals. This method helps the patient to establish a tolerance for the drug, thereby avoiding the toxic effects so often attributed to its use.

Bibliography

1. Clark-Kennedy, A. E.: Quinidine in the treatment of auricular fibrillation. *Quart. Jour. Med.*, 16:205, 1922.
2. Eyster, J. A. E., and Swarthout, E. E.: Experimental determinations of the influence of abnormal cardiac rhythms on the mechanical efficiency of the heart. *Arch. Int. Med.*, 25:317, (March) 1920.
3. Frey, W.: Ueber Vorhofflimmern beim Menschen und seine Beseitigung durch Chinidin. *Berl. klin. Wchnschr.*, 55:450, 1918.
4. Hay, J.: Action of quinidine in treatment of heart disease. *Lancet*, 2:543, 1924.
5. Hirschfelder, A. D.: *Diseases of the Heart and Aorta*. J. B. Lippincott Company, Philadelphia and London, 1918.
6. Jameson, R. A.: Quinidine sulphate in cardiac irregularities. *Can. Med. Assoc. Jour.*, 15:782, 1925.
7. Kerkhof, Arthur C., and Bauman, Hans: Minute volume determinations in mitral stenosis during auricular fibrillation and when restored to normal rhythm. *Proc. Soc. Exper. Biol. and Med.*, 31:168-170, 1933.
8. Kohn, C. M., and Levine, S. A.: An evaluation of the use of quinidine sulphate in persistent auricular fibrillation. *Ann. Int. Med.*, 8:923-938, (Feb.) 1935.
9. Korns, H. M.: An experimental and clinical study of quinidin sulphate. *Clinical. Arch. Int. Med.*, 31:36, (Jan.) 1923.
10. Levine, Harold D.: Effect of quinidine sulphate in inhibiting ventricular fibrillation. *Arch. Int. Med.*, 49:808-815, (May) 1932.
11. Levy, R. L.: Clinical studies of quinidin: IV. The clinical Toxicology of quinidin. *Jour. Am. Med. Assn.*, 79:1108, (Sept. 30) 1922.
12. Lewis, T.: Value of quinidine in cases of auricular fibrillation and methods of studying clinical reaction. *Am. Jour. Med. Sci.*, 163:781, 1922.
13. MacKenzie, J.: Quinidine in auricular fibrillation. *Brit. Med. Jour.*, 2:576, 1921.
14. Morawitz, P., and Hochrein, M.: Zur Verhütung des akuten Herzstodes. *München. med. Wchnschr.*, 76:1175, (June) 1929.
15. Nathanson, M.: Personal interview.
16. Smith, W. Carter; Walker, George L.; and Alt, Howard L.: The cardiac output in heart disease. *Arch. Int. Med.*, 45:706, 1930.
17. Viko, L. E.; Marvin, H. M.; and White, P. D.: A clinical report on the use of quinidine sulphate. *Arch. Int. Med.*, 31:345, (March) 1923.
18. Weisman, S. A.: Auricular fibrillation—Ambulatory treatment with quinidine. *Arch. Int. Med.*, 49:728-734, (May) 1932.
19. Weiss, S., and Thatcher, R. A.: Studies on quinidine. *Jour. Pharmacol. and Exper. Therap.*, 30:335, 1927.

HUGE OVARIAN CYSTS

CHARLES W. MAYO, M.D.,† and H. W. K. ZELHOFER, M.D.‡

Rochester, Minnesota

HUMAN curiosity seems unable to resist the lure of the unusual; collections of the "smallest," the "biggest," the "oldest," and so forth, have always been interesting to the majority of people. Physicians are no exception to this. "Believe it or not" has become almost a byword.

Recently, at The Mayo Clinic, a simple cyst, weighing about 10 kg., was removed from the right ovary of a girl, seventeen years of age. There was nothing concerning the case which warranted reporting it except that it was the "largest simple ovarian cyst" of a girl of that age seen at The Mayo Clinic in the past thirty years. Stimulated by this case, we thought it would be interesting to review similar cases in which examination had been made since the founding of the clinic.

On January 24, 1888, Dr. C. H. Mayo removed a cyst weighing $65\frac{1}{2}$ pounds (about 30 kg.) from the left ovary of a woman, aged twenty-three years. A cyst weighing 32 pounds (about 15 kg.) had been removed from the patient's right ovary five years previously. The woman had married and had been delivered of a child within a year following the first operation. An incisional hernia had developed during the pregnancy, and the left ovarian cyst had protruded through this and hung down to the patient's knees at the time of the second operation. That same year Dr. Mayo removed a simple cyst of the right ovary, weighing $36\frac{1}{2}$ pounds (about 16 kg.) from a woman, aged forty-six years, and a multilocular cyst, weighing 40 pounds (about 18 kg.) from the right ovary of another patient.

On June 1, 1920, Dr. W. J. Mayo removed a simple cyst of the left ovary, measuring 60 cm. in diameter and weighing 82 pounds (about 37 kg.), from a woman, aged fifty-three years. She had been aware of gradual enlargement of the abdomen in the past twelve years, and operation had been advised nine years previously. Her only complaint was of moderate dyspnea two weeks previous to operation; she had car-

ried on all of her household duties until that time. She had gained 47 pounds (about 21 kg.) during the past ten years but appeared to be extremely emaciated. October 21, 1922, Dr. W. J. Mayo removed a carcinomatous cystadenoma of the right ovary, weighing 100 pounds (about 45 kg.) from a woman, aged sixty years.

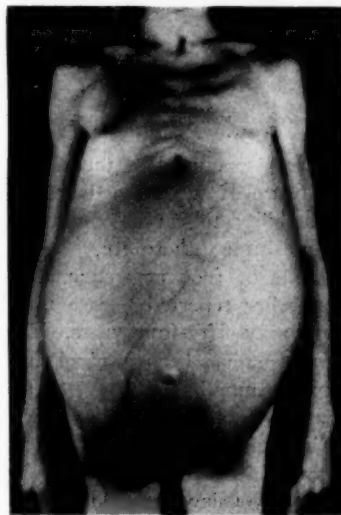


Fig. 1. Appearance of abdomen before removal of large ovarian cyst.

This immense tumor had protruded through an umbilical hernia which had developed during labor, thirty years previously. The patient's husband had made a large harness with which to support the herniation so that the woman could go about her household duties. October 30, 1924, Dr. Mayo removed a multilocular cystadenoma of the left ovary, which weighed 50 pounds (about 23 kg.), from a woman aged forty years. She gave a history of general discomfort and enlargement of the abdomen for the previous four years.

April 22, 1935, Dr. Pemberton removed a multilocular pseudomucinous cystadenoma, weighing 51 pounds (about 23 kg.), from the right ovary of a girl, aged nineteen years. Her relatives had first noticed the enlarging abdomen in 1931; they said that they had been told it

†From the Division of Surgery, The Mayo Clinic.
‡Fellow in Surgery, The Mayo Foundation, Rochester, Minnesota.

was attributable to poor posture. Later an "herbiologist" was consulted. Thereafter, the patient waited two and a half years for the tumor to disappear, but without result (Fig. 1).



Fig. 2. Distention of abdomen in Concato's disease.

When she was examined at the clinic her only complaints were of moderate dyspnea on exertion and inability to eat a normal amount of food at one time; therefore, she had eaten small amounts of food at frequent intervals.

Dr. Counseller reported a case in which the patient was aged fifty-four years. The abdominal enlargement had been gradual and painless for twenty-two months. During the six months before her examination she had noticed a constant feeling of pressure in the rectum and marked varicosities had developed in both lower limbs. A multilocular pseudomucinous cystadenoma, weighing 40 pounds (about 18 kg.) was removed from the left ovary, on November 1, 1935.

In consideration of enlargement of the abdomen, caused by ovarian cysts, it seems worth while to mention a case reported by Dr. W. J. Mayo in 1922. A woman, aged twenty-two years, two years before her visit to the clinic, had undergone an exploratory operation because of an enlarging abdomen and a diagnosis had been made of inoperable carcinoma. The abdomen had enlarged again after operation, and she was then examined by Dr. Mayo, who removed a bilateral intracystic and extracystic papillary cystadenoma of the right ovary, which weighed 139¼ pounds (about 63 kg.). The weight of the specimen, plus the weight of the fluid which was present in the cyst and free in the abdomen totaled 161 pounds (73 kg.). Before operation, the patient weighed 277 pounds (about 125 kg.). Ten days after operation she

weighed 119 pounds (54 kg.), a loss of 158 pounds (about 72 kg.). This proved to be a case of Concato's disease (polyserositis), and is without an equal at The Mayo Clinic, so far as enlargement of the abdomen is concerned (Fig. 2).

Recently, one of us (C. W. Mayo) removed a simple cyst of the left ovary, measuring 32 by 28 by 17 cm., and weighing 21¾ pounds (about 10 kg.) from a girl, aged seventeen years. On January 17, 1936, one week later, he removed a simple cyst of the right ovary, measuring 30 by 28 by 21 cm., and weighing 22¼ pounds (also about 10 kg.), from a girl, nineteen years of age. Histories given by these two girls were practically identical. Both had noticed gradual, painless enlargement of the abdomen, during the last eighteen months. Both had been active in university life, including athletics, until they came to the clinic. Neither had experienced any gastro-intestinal or genito-urinary distress. In each case, physical examination did not reveal any abnormality except the distended abdomen. Laboratory tests gave entirely negative results. Diagnosis centered on abdominal ascites, tuberculous peritonitis, and huge ovarian cyst.

In the differential diagnosis of disease associated with distended abdomens, the following suggestions are worthy of consideration: The general contour of the abdomen, in cases of large ovarian cysts, tends to be rounded in both directions, whereas, in cases of marked abdominal ascites, the contour is flattened. When possible, a digital examination, with one finger in the rectum and one in the vagina is helpful. If there is a general bulging of the cul-de-sac of Douglas, when pressure is applied to any place on the abdomen, the cause of the distention is more likely to be ascites than ovarian cyst. However, it is not always possible to make a digital examination; for instance, if an intact hymen is present. Examination of the pelvis in cases of large, distended abdomen, even under the best conditions, presents many difficulties. One is more likely to receive impressions rather than to ascertain facts from such examination. If the motion of the uterus is limited, the diagnosis of ovarian cyst is suspected; however, if the uterus is freely movable, ascites is more likely to be present.

Roentgenologic examination, after the administration of a barium enema, is of assistance in

differential diagnosis. The colon is found to be pushed to the periphery of the abdominal cavity if a large cyst is present. This is characteristic of any large mass lying extrinsic to the colon and is not seen otherwise. The sedimentation rate of erythrocytes is increased if the distention is caused by tuberculous involvement of the peritoneum; hyperpyrexia usually occurs in the late afternoon in such cases.

The infrequency of any symptom other than a gradual, painless enlargement of the abdomen was significant in the great majority of the histories which we reviewed. Gastro-intestinal, genito-urinary or circulatory symptoms were gener-

ally absent except that several patients had had moderate dyspnea when the abdomen was considerably distended. The patient usually has noticed some loss of flesh in the face and limbs, although the scales point to an increase in weight. This increase before operation seldom compensates for the weight of the cyst when it is removed.

Even with the help of these diagnostic aids, diagnosis continues to be most difficult in some cases. Continuous caution should be exercised in order that abdominal paracentesis is not performed rather than oöphorectomy in cases of large ovarian cyst.

OVULATION PAIN*

ROY N. ANDREWS, M.D.

Mankato, Minnesota

TWO clinical signs of ovulation in the human being have been recognized by gynecologists, namely, the intermenstrual pain or "Mittelschmerz" and intermenstrual spotting. The former is probably due to the greatest distention of the follicle just preceding rupture. It is not common. It may be perfectly regular, occurring on one side one month, and on the opposite side the next. Or only one side may be painful, distention of the ovary on the opposite side causing no pain. Some abnormality in innervation of the ovary is probably responsible for the phenomenon reaching consciousness. Intermenstrual spotting occurs quite infrequently. It may last from one hour to forty-eight hours, and the bleeding may be very slight or moderate.

As a third indication of the time of ovulation we get a sudden appearance of the follicle stimulating hormone (prolan A) in the urine of normal nonpregnant women.

The appearance of a positive prolan A reaction in the urine in these patients at about the middle of the intermenstrual intervals immediately suggests that this excretion is closely related to the phenomenon of ovulation. It has now been definitely demonstrated that the stim-

ulus for ovulation proceeds from the anterior lobe of the pituitary gland, the site of elaboration of prolan A.

Clinically, it is thought that the "Mittelschmerz" is due to the greatest distention of the follicle, *i.e.*, just prior to rupture. However, normally, ovulation is not associated with pain.

Ovulation pain recurs regularly at the same time in the intermenstrual cycle, usually about midway between each two menstrual periods. The condition is not common and diagnosis of intermenstrual pain should not be made unless the pain recurs at about the same time for at least a number of months. During periods of amenorrhea as in pregnancy and lactation, the attacks of pain are absent. The pain, which is not characteristic, is usually confined to one iliac fossa but sometimes to both. It usually lasts a few hours but may endure for days, although in the latter case it is not steady. In about 50 per cent of the cases of intermenstrual pain there is a vaginal discharge present during the attack. The discharge may be watery, mucous, yellowish and occasionally bloody. In some cases in which the discharge is bloody or blood-stained there is a local cause for bleeding, such as a polyp or submucous fibroid. However, as Hartman¹ points out, "the bleeding associated with inter-

*Presented at the annual meeting of the Southern Minnesota Medical Association, Austin, Minnesota, August 25, 1935.

menstrual pain may be a pathologically accentuated expression of a phenomenon that occurs in some animals." Many individuals regard as menstruation the visible periodic bleeding of bitches. This designation is wrong, as evidenced by its time relation to ovulation. The bleeding precedes and accompanies ovulation and hence should be called "proestrous bleeding." A similar and homologous bleeding occurs at the cotyledons of the cow. A final proof of the homology is Hartman's discovery of the intermenstrual bleeding in the monkey, which frequently occurs in the middle of the menstrual cycle. It is usually microscopic, is always less than in the dog, and is, in both species, a concomitant of the congestion that accompanies the presence of a maturing follicle. Hartman wonders whether future study will not show that intermenstrual bleeding in the human female is physiologic and normal rather than abnormal.

Most of the women afflicted with intermenstrual pain are young, but the attacks of pain rarely make their appearance with the onset of puberty. The attacks may recur for many years, even lasting throughout the entire reproductive period. A large proportion of these women are sterile. The menstrual periods are usually normal, and, if dysmenorrhea is present, it is usually much less severe than the intermenstrual pain. Many, but by no means all the women who suffer intermenstrual pain, have pelvic disease.

Case History

The patient, Mrs. H., was a married woman, thirty-two-years of age. The family history was negative. She had two children, two and three years old. Her menses were regular. Her general health had been fair. She had had no major illness.

Her present complaint consisted of pain between her menstrual periods. The pain started through the rectum, gradually working into the vaginal opening, and upward. It was a shooting pain, and at times was very severe. The first attack occurred about May, 1934. It was not severe, and the patient did not pay much attention to it. It came in the middle of her menstrual period and lasted for two hours. The second attack occurred the last part of November. The pain started at noon, and was quite severe until about 5:30 p. m. She was given morphine hypodermically, with very little relief. The pain lasted through the night, until 8 o'clock the next morning. Then another hypo

was given, and by 11 a. m. the pain was gone. This attack occurred eighteen days after the first day of her menstrual period. In none of the attacks did any spotting occur, except that there was a vaginal discharge at that time. The third attack came on Christmas day, exactly eleven days after the first day of her menstrual period. This attack started with shooting pain through the rectum, the pain working into the vagina. The pain started about 9 o'clock in the morning. She took several morphine tablets, and a hypodermic was given. The pain disappeared about noon of the next day. The hypodermic gave some relief, but she was not relieved entirely.

On physical examination the patient appeared acutely ill, weighing 101 pounds. Findings in examination of the head, heart and lungs were negative. The abdomen was very tender throughout, with no localization areas, but some tympanitis. Pelvic examination showed uterus and adnexa normal to palpation, but very tender. Urine was negative. The hemoglobin was 72 per cent, the white blood count 6,000.

The conditions to be considered in differential diagnosis were endometriosis, ectopic pregnancy, twisted ovarian pedicle and gastro-intestinal disturbances, especially appendicitis. Ectopic pregnancy and twisted ovarian pedicle are more likely to be attended with fulminating than with mild hemorrhages, so that in either instance operative treatment is necessary. The pain and tenderness of endometriosis is usually more intense near the time of menstruation and subsides during the intermenstrual period. Furthermore, they more frequently occur later in the reproductive cycle. In appendicitis the symptoms are progressive, while in a mild hemorrhage the symptoms are slight and do not progress to any great extent. A carefully taken history of the onset of the symptoms, and attention to the localization of the pain and tenderness, were therefore extremely important.

Ruptured ectopic pregnancy usually gives the history of one or more abnormal menstrual periods; there is usually some vaginal bleeding; softening of the uterus just proximal to the internal os may be present, and the breasts may show the changes of early pregnancy. If there is bleeding from the uterus, not menstrual in type, the case is probably not one of ovarian hemorrhage.

Treatment consisted of antuitrin S. Seven doses in all were given, starting immediately after the intermenstrual cycle—four after one cycle and three after another.

The patient has had no attacks since treatment was instituted. This treatment was initiated on the basis of very favorable reports in the literature, but the rationale was not definitely established.

Reference

- Hartman, C. J.: *Am. Jour. Obst. and Gyn.*, 19:511, (April) 1930.

HORMONAL EFFECTS IN WOMEN

E. C. HARTLEY, M.D.

Instructor in Obstetrics and Gynecology, University of Minnesota
Saint Paul

TO a considerable extent the physiological activities of the body are governed and made to function in an orderly manner through the influence of hormones produced in the ductless glands. As an example of such action, none appears more amazing than does the hormonal control of the phenomena which comprise the reproductive mechanism in women. A number of glands are involved, producing in rhythmic sequence a series of tissue and organic reactions of considerable scope and magnitude.

Clinically, the exercise of this hormonal function is best expressed and is most easily understood by considering four critical events which illustrate the operation of the whole mechanism. These are puberty, menstruation, pregnancy, and the menopause. Departures from normal may also be as readily understood from this viewpoint as from any other.

Normally, puberty finds the young girl sufficiently grown to accept the possibilities of sexual maturity. Even normally, however, puberty may be reached by some at ten, by others at fifteen years or later. It may be further hastened or delayed by pathological processes, and in laboratory animals sexual maturity may be artificially produced while body growth is still infantile. Puberty marks the period when the ovaries, stimulated by the gonadotropic hormones of the anterior pituitary, first produce ripe ova, follicular and corpus luteum hormones, and these, in turn, produce those vascular and endometrial changes in the uterus known as menstruation.

The primary stimulus is from the anterior pituitary. This gland, which contains but two kinds of secretory cells and which weighs only half a gram, controls the gonads, body growth, the thyroid, the breasts, the adrenals, and also the metabolism of certain substances.²⁰ Its destruction is followed (in part) by complete atrophy of the generative organs.⁹ While it stimulates both the follicles and the corpus luteum it is not certain that it does so through one or through two hormones; nevertheless, perhaps for convenience the literature refers to the folli-

cle-stimulating and the luteinizing hormones of the anterior pituitary.

The hormone developed in the graafian follicle is essentially a growth stimulator. Under its influence¹ the endometrium grows rapidly from the basal layer, reaching a maximum thickness at about the midpoint of the cycle when ovulation occurs. The glands then form a secretion rich in glycogen, and the nuclei are pushed downward to lie at the base of the cells. The glands, growing more rapidly than the stroma in which they lie, comprise relatively more and more of the picture and must arrange themselves in coils to accommodate themselves to the decreasing space. This secretory phase begins at about the fourteenth day of the normal twenty-eight day cycle. It is controlled by the stabilizing influence of the corpus luteum, developed in the site of the ruptured follicle.

Biologically the transition at this midpoint is a tremendous one; there is a definite change in the endometrium and there is a definite change in the state of the uterine muscle tone.⁹ With the establishment of the corpus luteum influence and the secretory phase, the endometrium is ready to receive the fertilized ovum.¹⁹ There is ample nourishment for it in the glycogen-bearing glands until the trophoblast develops and establishes the placental circulation; there is also a quiescent uterine muscle which will not disturb, by undue contractions, the growing mass within its lumen.

Fluhmann¹⁰ emphasizes that without the fertilized ovum there is not only the production of corpus luteum secretion "progesterin," but estrin is formed in greater amounts than ever. "This estrin production causes a progressive inhibition of the anterior lobe, so that the amount of ovary-stimulating hormone available gradually diminishes. Finally, estrin reaches its peak and correspondingly the amount of anterior lobe sex hormone diminishes to a point insufficient to maintain the corpus luteum. This structure undergoes degeneration, which results in a cessation of estrin and progesterin production and thus

a breaking down of the endometrium (menstruation). The absence of estrin now releases the inhibition of the anterior pituitary gland, which again puts out its sex hormone to stimulate the development of a follicle for the next cycle."

Should pregnancy occur, this picture changes. The corpus luteum develops to a larger size and persists for a longer period than it otherwise would, stabilizing the uterus. Why does the presence of a developing ovum change the picture outlined above? The presence of large amounts of estrin at this time should inhibit the activity of the pituitary and insure the same course of events as occurred in the menstrual cycle. The answer apparently is found in the pregnancy urinary hormones.¹⁰

With the menopause there is a cessation of ovarian activity and of uterine response; atrophy of the generative organs occurs, affecting not only the vaginal mucosa but the size of the uterus and ovaries.

The extension of knowledge in regard to hormonal control of the generative apparatus has been accompanied by some confusion. In part this is due to a cyclic arrangement of the events, in the description of which one may begin at any point so long as he ascribes to it no special significance other than its place in a circle whose beginning or end shares the obscurity of any ultimate biological process. In part, also, it is due to the uncertainty regarding the source and nature of the hormones excreted so profusely in the urine of pregnant women and pregnant mares.

The gonad-stimulating, or gonadotropic, hormone (or hormones) of the anterior pituitary has been mentioned, together with that of the graafian follicle and of the corpus luteum. The chief functions of each have been mentioned. Each apparently has an obvious place of origin and an obvious function.

Then it was learned that hormones were excreted in the urine in variable amounts which reached an enormous peak during pregnancy.⁹ Whence, what, and why, were natural questions, and progress towards their answers has added enormously to the literature of endocrinology.

Their origin is probably not, as was first supposed, from the anterior pituitary, though their action resembles that produced by the anterior pituitary. It appears that they arise from the

placenta, the fetal or chorionic portion of which becomes a gland of internal secretion.^{3,6,7,9,10}

Thus we are confronted with the astonishing thought that in pregnancy there is produced in the placenta hormones we had definitely associated with specific, fixed anatomical structures elsewhere in the body. And it is from the urine of pregnant women (or pregnant mares) that practically all of the female endocrine products now marketed are obtained.

In general, the pregnancy urine preparations are estrogenic (producing estrus in spayed rats, as does the follicle hormone) or luteinizing (inducing corpus luteum formation as does the anterior pituitary, in part). Of the estrogenic⁷ variety there are two types, qualitatively similar, and each is similar, if not identical, with the follicular hormone of the ovary. Of the luteinizing variety there is only one. It develops in quantity earlier than the estrogenic type^{3,12} and it is upon the effects produced by this A.P.L. or gonadotropic hormone that the pregnancy tests of Aschheim and Zondek and of Freidman are based.³ The really basic importance of this hormone lies in the fact that it "acts to prolong the life of the corpus luteum, which is then able to further the endometrial changes required by the young embryo."¹⁰

These pregnancy urine hormones may all be isolated from one specimen of urine; Collip, in extracting placenta, found, in the end stage, the estrogenic hormone in the filtrate and the A.P.L. principle in the precipitate.⁶

Common commercial preparations⁴ of the estrogenic principle of pregnancy urine are theelin, theelol, emenin, amniotin, progynon, œstrone, œstriol, folliculin; of the gonadotropic principle there are follutein, prolan, antuitrin "S," and Collip's A.P.L. principle. Since the hormone from the follicular fluid and the estrogenic hormone of pregnancy urine are apparently identical there is no need for the former; whether the gonadotropic principle replaces in the same degree the corpus luteum hormone seems as yet questionable. The actual corpus luteum hormone, named progestin by Corner and Allen, will probably be available soon. One preparation, proluton, has been available, capable of producing, apparently, typical corpus luteum effects.¹⁷ The use of progestin by Krohn¹⁸ and others in the prevention of threatened and ha-

bitual abortion apparently offers satisfactory clinical proof of the function ascribed to corpus luteum activity above.⁸

Most of these urinary products are "methyl derivatives of a four-ringed hydrocarbon, $C_{17}H_{18}$, itself a derivative of phenanthrene, while it is now recognized that cholesterol, ergosterol, calciferol (vitamin D), and other sterols, and all the cholic acids are derivatives of this same four-ringed compound."⁶

The estrogenic potency of these substances has been demonstrated in laboratory animals; to do so in women was more difficult. Kaufmann¹⁷ describes his successful attempts to produce complete menstrual changes in castrated women and in women with primary amenorrhea. Stimulated by the prophecy of Parkes that extremely large doses would be needed, Kaufmann, using one million international units of estrin (theelin), was able to induce the normal endometrial growth. Following this, he induced the changes of the secretory phase by the use of corpus luteum and a typical menstrual flow containing pieces of mucous membrane characteristic of the secretory phase. One million international units of estrin sounds like a very large dose; Kaufmann disposes of this as follows: The chemists, Schwenk and Hildebrandt "showed that hydrogenation converts estrin into a much more active derivative," dehydro- α -estrone, which is about four times as active as α -estrone (estrin, theelin). One c.c. of this substance contains 250,000 international units, and, instead of speaking of international units, Kaufmann speaks of the physiological dosage, or the amount necessary to produce menstruation in a castrated woman. Along with endometrial changes, Kaufmann produced in several of his patients with primary amenorrhea a considerable change in size of the uterus. The potency of the follicular hormone obtained from pregnancy urine is therefore a well-established fact.

Kaufmann gave his follicular preparation over a period corresponding to the follicular phase of the menstrual cycle. He then gave corpus luteum hormone over a period of five days beginning on the nineteenth day. With the stopping of the corpus luteum, menstruation followed.

It has been for a long time anticipated that excessive development of the endometrium as seen in hypertrophic endometritis was due to an

excessive follicular development and an absence of corpus luteum formation.²¹ Kaufmann simulated such a condition by administering over a period of several weeks some five million international units of estrin. This produced dilated and cystic glands, of which none was convoluted and none contained glycogen. "The characteristic signs of corpus luteum hormone function are therefore absent."¹⁷ The excessive bleeding so often characteristic of hypertrophic endometritis presumably should be controlled clinically by the administration of corpus luteum hormone. That result has been successfully achieved by Kaufmann and a number of other observers, using not only actual corpus luteum preparations but also by the use of A.P.L. preparations (antuitrin "S"), etc., whose luteinizing function produces the same effect as the pure corpus luteum hormone, though probably in different ways (substitution vs. stimulation?).^{14,24}

The experiments of Kaufmann illustrate very clearly the effects of relatively pure follicular and corpus luteum hormones. (It is apparently true that the urinary preparations used by Kaufmann and which are used in this country under the name of theelin, etc., are actually identical with the follicular hormone produced in the ovaries.) The action of the anterior pituitary-like (or A.P.L. products, antuitrin "S," etc.) is less clear. A number of studies have been made upon the effects of the use of this substance. One of the most recent by Hamblen and Ross¹⁴ describes the effect in twenty-four patients of the preoperative administration of A.P.L. (antuitrin "S") upon ovarian tissue. They feel that certain changes are effected which often result in the formation of follicular cysts. In general they feel that the action of these extracts is more typical of the gestational than of the menstrual cycle, and the changes in the ovaries would not differ widely from those of ovaries in pregnancy. Its action is probably not that of a substitute (as in progestin); it appears, rather, to act through its stimulation of corpus luteum activity in the ovary.

Roughly, the cyclic arrangement of the picture is apparent: the anterior pituitary affects the ovary, stimulating it to follicle and to corpus luteum formation; these in turn stimulate certain changes in the uterus. The mechanism for the shifting dominancy of each phase, so that any

one may not maintain an ascendancy (as apparently happens in hypertrophic endometritis), is explained as follows: When the level of follicular hormone reaches a certain point, the stimulating action of the anterior pituitary is held in abeyance; as the level falls (following menstruation) the anterior pituitary again becomes active and again stimulates follicle formation. The balance may break pathologically, as we have seen, in the menstrual cycle and produce hypertrophic endometritis; in a like manner, presumably, a break in the gestational cycle will produce abortion and may, apparently, be prevented by the use of corpus luteum preparations. It is of interest to note that Bourne⁶ was unable to induce labor by means of large doses of estrin.

No comparable substitution therapy is available for the anterior pituitary. Any failure or diminution in its productivity may only be overcome by the still uncertain, and perhaps dangerous, method of directly stimulating that gland by x-ray. The only qualification to this statement lies in existence of the A.P.L. products (antuitrin "S" and "G") whose potency and specificity are not of the same degree as are the follicular and corpus luteum products.

Novak and others have emphasized the fact that the present knowledge of hormones in obstetrics and gynecology is far from complete or satisfactory. Hoskins¹⁶ has reviewed a number of "complexity factors," as, for instance, the effect of the hormones on the internal milieu and of the milieu upon the hormones; the complete picture of glandular imbalance as differentiated from a compensated deficit or plethora; the question of the complex equilibrium²⁵ of all glands of internal secretion; and he emphasizes, with others,²⁶ the question of tissue subjectivity to hormones, and suggests that, if refractory, the cause may be found in a vitamin deficiency in the individual. The place of other glands, such as the suprarenal,¹¹ the thyroid,²³ the pancreas and the parathyroids, is receiving a great deal of attention but will not be discussed in this review.

Anspach and Hoffman² indorse the tendency in the literature to question the constancy in relationship between the state of ovarian function and periodicity of flow and the validity of the view that menstrual bleeding depends upon the regression of the corpus luteum. Hartman¹⁵ also objects to this idea of basing the cause of

menstruation on a purely negative phenomenon. Moore²² discusses the uncertainties in our present dosage of hormones and the basis of the threshold of effectiveness. He emphasizes, among others, the fact that the hormone of a given gland does not stimulate itself, but is instead injurious; that the gonads have no power of self-regulation, and emphasizes again that hypophyseal action is modified by the gonadal hormones. In this connection, however, Mazer²⁰ has been able to detect no marked constitutional effects from large doses of estrogenic principles (progynon B or theelin). He did find, however, that in six of seventeen regularly menstruating women it caused a delay of from one to three weeks in the onset and established a new date of menstruation.

The need for a conception of the extensive interrelationship between the glands of internal secretion is apparent in Grumbrecht's¹³ discussion of the elimination of thyrotropic substance in the urine of menopausal women. The permanent release of the inhibiting effects of estrin which occurs at the menopause may result in an excessive stimulation of the thyrotropic function of the anterior pituitary in the same manner in which it releases an excessive amount of follicular hormone. The presence of an excessive amount of follicular hormone, characteristic of the urine of women in the menopause, or of castrates,²⁷ would result in excessive bleeding, so often associated with the onset of the menopause.^{9,20} In a like manner the presence of an excessive amount of the thyrotropic hormone would result in the vasomotor changes occurring in women at the menopause, changes strikingly similar to those produced by increased action of the thyroid.

Bibliography

1. Allen, E.: Menstruation. *Jour. Am. Med. Assn.*, 104:1901-05 (May 25), 1935.
2. Anspach, B. M., and Hoffman, J.: Endometrial findings in functional menstrual disorders. *Am. Jour. Obst. and Gyn.*, 28:473-81, (Oct.) 1934.
3. Aschheim, S.: Pregnancy tests. *Jour. Am. Med. Assn.*, 104:1324-29, (April 13) 1935.
4. Biskind, M. S.: Commercial glandular products. *Jour. Am. Med. Assn.*, 105:667-76, (Aug. 31) 1935.
5. Bourne, A.: Failure of oestrine as means of inducing labour. *Proc. Roy. Soc. Med.*, 27:864, (May) 1934.
6. Cameron, A. T.: Recent advances in endocrinology: 2nd ed. Phila., Blakiston, 1935.
7. Collip, J. P.: Interrelationship among urinary, pituitary and placental gonadotropic factors. *Jour. Am. Med. Assn.*, 104:556-58, (Feb. 16) 1935.
8. Corner, Geo.: Corpus luteum therapy. *Jour. Am. Med. Assn.*, 104:1899-1901, (May 25) 1935.
9. Evans, H. M.: Clinical manifestations of dysfunction of the anterior pituitary. *Jour. Am. Med. Assn.*, 104:464-72, (Feb. 9), 1935.

10. Fluhmann, C. F.: Stimulating hormones. *Am. Jour. Obstet. and Gyn.*, 28:668-81, (Nov.) 1934.
11. Freeman, W., and Melick, J. M.: Suprarenal cortex therapy in pernicious vomiting of pregnancy. *Am. Jour. Obst. and Gyn.*, 29:602-04, (April) 1935.
12. Frank, Robert T.: Sex-endocrine factors in blood and urine in health and disease. *Jour. Am. Med. Assn.*, 104: 1991-97, (June 1) 1935.
13. Grumbrecht, P.: Elimination of thyrotropic substance in urine of menopausal women. *Zent. f. Gynak.*, 59:1331-5, (June 8) 1935; *abstr. Jour. Am. Med. Assn.*, 105:325, (July 27) 1935.
14. Hamblen, E. C., and Ross, R. A.: A study of ovaries following preoperative administration of an extract of pregnancy urine. *Am. Jour. Obstet. and Gyn.*, 31:14-29, (Jan.) 1936.
15. Hartman, C. G.: The phylogeny of menstruation. *Jour. Am. Med. Assn.*, 97:1863-5, (Dec. 19) 1931.
16. Hoskins, R. G.: Progress and problems in endocrinology. *Jour. Am. Med. Assn.*, 105:948-951, (Sept. 21) 1935.
17. Kaufmann, C.: Therapeutics with hormones of ovary. *Proc. Roy. Soc. Med.*, 27:849-63, (May) 1934.
18. Krohn, L., et al: The use of lutein hormone, progesterin, in threatened and habitual abortion. *Am. Jour. Obst. and Gyn.*, 29:198-206, (Feb.) 1935.
19. Kurzrok, R., Kirkman, I. J., and Creelman, M.: The time of human ovulation. *Am. Jour. Obst. and Gyn.*, 28: 319-33, (Sept.) 1934.
20. Mazer, et al: Evaluation of the constitutional effects of large doses of estrogenic principle. *Jour. Am. Med. Assn.*, 105:257-63, (July 27) 1935.
21. Meyer, Robert: Lecture Notes, 1923.
22. Moore, C. R.: Hormones in relation to reproduction. *Am. Jour. Obst. and Gyn.*, 29:1-18, (Jan.) 1935.
23. Mussey, R., and Haines: Amenorrhea and oligomenorrhea associated with low basal metabolic rates. *Am. Jour. Obst. and Gyn.*, 27:404-8, (March) 1934.
24. Novak, E.: The uses and abuses of modern gland products in gynecologic disorders. *Jour. Am. Med. Assn.*, 105:662-67, (Aug. 31) 1935.
25. Sevringhaus, E. L.: The relief of menopausal symptoms by estrogenic preparation. *Jour. Am. Med. Assn.*, 104:624-28, (Feb. 23) 1935.
26. Smith, P. E.: General physiology of the anterior hypophysis. *Jour. Am. Med. Assn.*, 104:548-53, (Feb. 16) 1935.
27. Smith, P. E.: The hypophyseal gonadotropic hormones. *Jour. Am. Med. Assn.*, 104:553-56, (Feb. 16) 1935.

THE CLINICAL SIGNIFICANCE OF OVARIAN CYSTS*

SELMA C. MUELLER, M.D.

Duluth, Minnesota

APPROXIMATELY 90 to 95 per cent of all ovarian tumors are cysts. Many of these are derived from the graafian follicle, which is itself a cystic body in its normal state. The point at which it leaves its physiologic size and attains pathologic proportions cannot be definitely stated. Numerous writers have demonstrated cystic follicles in fetuses and in newborn infants. Spivak⁶ found growing and maturing follicles in twenty-nine of a series of thirty-six fetal and young infant ovaries.

The surgeon, in performing laparotomies frequently finds cysts of the ovaries, and the question arises as to their significance and the treatment indicated.

In an attempt to determine what proportion of ovarian tumors, particularly cysts, cause functional abnormalities as shown by changes in the menstrual cycle, a series of case histories from St. Luke's Hospital, together with pathologic findings, has been studied. The material consisted of cases with a diagnosis of some ovarian lesion occurring during the years 1932 to 1934, inclusive.

A total of 186 cases had a diagnosis involving the ovary, with or without other diagnoses. Of these, 169 (90 per cent) were diagnosed cyst, cystic change or corpus luteum cyst, with or without associated lesions. Fourteen (7 per cent) were malignant ovarian tumors, four pseudo-

mucinous cysts, five carcinomas of the ovary, four papillary cystadenomas, and one sarcoma. Eight (4 per cent) were diagnosed parovarian cysts. Four were dermoids. Two each were "multilocular" cysts and chocolate cysts. There was one endometrial cyst, one fibroma and one fibrosis of the ovary.

In thirty-nine cases, more than one type of cyst was mentioned, or the cyst was associated with inflammatory changes in the tubes, ovaries or appendix.

The ages of the patients varied from fifteen years to seventy-seven years, and it was interesting to note that the oldest patient (seventy-seven years) had a benign ovarian cyst, while one of the fifteen year old patients was operated upon for a pseudomucinous cyst weighing 8,100 grams. This patient died of a pulmonary embolus. The greatest number occurred between the ages of twenty and forty years, the years of greatest ovarian activity.

In reviewing the histories of these patients, particular interest was directed only to notes on the menstrual cycle, and the following points were revealed:

1. One hundred and two patients gave a history of regular, normal menses.
2. Seventeen were past the menopause and had noted no bleeding and may therefore be considered normal as to menstrual history.
3. Twenty-one gave a history of regular men-

*Presented at the meeting of the St. Louis County Medical Society, Oct. 10, 1935.

ses, but stated that the flow was somewhat more profuse than normal.

Thus, 140 (75 per cent) of these patients gave a history of *regular* menses.

Only forty (21 per cent) of the entire series gave a history of irregular menses. Of these, fourteen had a diagnosis of only "cyst" or "corpus luteum cyst," without any other pelvic diagnosis. The remaining twenty-six with irregular menstrual flow had additional diagnoses such as fibroids, cervical polyps, salpingitis and appendicitis. There were four tubal pregnancies included in this group.

Infection, either of the Fallopian tubes or of the appendix, was the most frequently found complicating diagnosis in the group of patients having irregular and profuse menstrual flowing. It occurred in twenty (50 per cent) of the forty cases.

Thus, in the final analysis, only fourteen cases, or 7 per cent of the entire series of 186 patients, gave a history of irregular menstrual flow which could be attributed only to the cysts of the ovaries: that is, in only fourteen cases was there no complicating factor, such as infection, fibroids, polyps, etc. This is a very small percentage and the question of the significance of ovarian cysts arises.

A great fund of clinical and experimental data has accumulated in the past few years concerning hormonal activity of the female sex glands. The interrelationships of the various female sex hormones have been quite definitely established. We know that the anterior pituitary hormone or hormones control ovarian activity, for in hypophysectomized animals the graafian follicles atrophy.⁵ There is still some argument as to whether the anterior pituitary sex hormone is single or consists of two separate and distinct hormones. Zondek,⁶ in Germany, and Wiesner,⁷ in Edinburgh, are the chief exponents of the theory of duality of the anterior pituitary hormone, calling them Prolan A and B and Rho I and II, respectively, the one being the follicle stimulating and the second the luteinizing hormone. Other investigators, particularly in this country,⁸ believe that only one sex hormone exists in the anterior pituitary body—that in small doses it stimulates ripening of the follicle, while with larger doses luteinization occurs. In either case, it is anterior pituitary prolant which controls ovarian activity. Normally a fine balance exists

between anterior pituitary and ovarian hormones. If an imbalance occurs, menstrual abnormalities result. A relatively frequent type of imbalance is that seen in functional metrorrhagias.³ Functional uterine bleeding is associated with hyperplasia of the endometrium and multiple follicle cysts of the ovary. Zondek,⁶ Wiesner,⁷ and others believe that there is a lack of the luteinizing hormone of anterior pituitary and therefore the follicle stimulating hormone acts without being augmented by the luteinizing hormone, resulting in graafian follicle hypertrophy. The follicles continue to secrete estrin, the follicular hormone, until pressure atrophy destroys the follicle cells. The estrin, acting upon the endometrium, produces hyperplasia with consequent uterine bleeding due to small areas of thrombosis and necrosis.² Thus we have a pituitary dysfunction primarily, consisting of absence of luteinizing hormone, to which the ovarian follicle cystosis is secondary.

However, all ovarian cysts are not found in cases showing this imbalance. It is the multiple follicle cystosis which is associated with cases of functional uterine bleeding. Simple serous cysts of the ovary do not contain granulosa cells, and therefore do not secrete estrin, and therefore bleeding is not found associated with this type of cyst.⁴ Proliferative cysts, such as pseudomucinous cystadenomata, papillary cystadenomata, and dermoids, do not produce estrin, nor do most solid ovarian tumors (carcinoma, fibroma, sarcoma). Granulosa cell activity must be present for the production of estrin. This is found only in follicle cysts and in so-called granulosa cell tumors of the ovary. In pregnancy, ovarian tumors of all types produce ovarian hormone, according to E. Phillip.⁴

In going back to the material of this study—we found that inflammatory lesions such as salpingitis and oöphoritis and appendicitis were associated with irregularities of menstruation in over half²⁰ of the cases showing this irregularity. Inflammation is said to be one of the most frequent causes of menstrual irregularities. This is due to fibrosis about the ovarian follicle,³ preventing rupture and ovulation, so that again the granulosa cells continue to secrete estrin while luteinization does not occur.

A cause of irregular bleeding not brought out by this study, and infrequently mentioned in the literature, is psychic stimulation. We know that

many
an ir
usual
of a s
pituit
terior
fects
been
doses
lation
only a
The
ment
cysts
lated
functi
strual
treatm
apy o
cysts
here a
if the
symp
portion
tosis
derly
left s
best r
chang
conse
opera
In
doses
been
al me
Ford
trial,
must
distur
giene
times
Th

many women, especially young women, will have an irregular menstrual period induced by unusual excitement. This is explained on the basis of a sudden nervous stimulation of the anterior pituitary, which causes a sudden liberation of anterior pituitary sex hormone. This in turn affects the ovarian secretion.⁸ Experiments have been performed in which injections of large doses of anterior pituitary hormone cause ovulation in the rabbit. Normally ovulation occurs only after coitus in the rabbit.

The question arises as to the type of treatment which should be instituted for the ovarian cysts frequently found at operation. Large isolated cysts should be excised, leaving as much functioning ovarian tissue as possible. If menstrual irregularities have occurred, operative treatment should be followed by hormone therapy of the proper type. The smaller multiple cysts may safely be punctured at operation, and here again hormone therapy should be instituted if the cysts are numerous or have produced symptoms. The older practice of resecting a portion of an ovary showing diffuse follicle cystosis is in most cases not advisable, since the underlying cause is not affected, and the ovary is left scarred. Hormone therapy should give the best results in these cases. When inflammatory changes are found these should be treated as conservatively as possible, in many cases post-operative heat treatment being very beneficial.

In addition to hormone therapy, stimulating doses of x-ray to the pituitary and ovary have been found beneficial in certain of the functional metrorrhagias and amenorrheas. Drips and Ford¹ have given this type of therapy a thorough trial, as have others. Additional measures which must not be overlooked in treating menstrual disturbances are improvement in the general hygiene, high vitamin diets, desiccated thyroid at times and calcium and iron administration.

Theoretically the old treatment of bimanual

palpation and rupture of a single ovarian cyst found on pelvic examination would be good treatment if followed by other measures, and if the diagnosis could be definitely established. But occasionally serious error might result and malignancy or other complications be overlooked.

Summary

1. Data on 186 patients with various ovarian lesions are presented.
2. Ninety per cent showed simple cysts or "cystic change."
3. One hundred and forty (75 per cent) gave a history of regular menstrual cycles.
4. Forty (21 per cent) gave a history of irregular menstrual flow. Only fourteen (7 per cent) of these had uncomplicated cysts.
5. Inflammation of the tubes, ovaries, or appendix was the most frequent complicating lesion in women having irregular menses.
6. The present conception of the pathologic physiology underlying functional uterine bleeding is that a lack of the luteinizing hormone of the anterior pituitary exists. This allows the follicular hormone to act without the luteinizing hormone, and the endometrial hyperplasia so induced results in hemorrhage.
7. Various methods of treatment of ovarian cysts and functional uterine bleeding are mentioned.

Bibliography

1. Drips, D. G., and Ford, F. A.: Irradiation of the ovaries and hypophysis in disturbances of menstruation. *Jour. Am. Med. Assn.*, 91:1358, 1928.
2. Fluhmann, C. F.: The endometrium in so-called idiopathic uterine hemorrhage. *Jour. Am. Med. Assn.*, 93:1136, 1929.
3. Mazer, C., and Goldstein, L.: *Clinical Endocrinology of the Female*. W. B. Saunders Co., 1933.
4. Phillip, E.: Hormongehalt von Cysten und Neubildungen der Eierstöcke. *Zentralbl. f. Gynaek.*, 58:555, 1934.
5. Smith, P. E., and Engle, E. T.: Experimental evidence regarding the rôle of anterior pituitary in the development and regulation of the genital system. *Am. Jour. Anat.*, 40:159, 1927.
6. Spivack, Mary: Polycystic ovaries in the newborn and early infancy and their relation to the structure of the endometrium. *Am. Jour. Obst. and Gyn.*, 27:157, 1934.
7. Wiesner, B. P.: Quoted by Mazer and Goldstein.
8. Young, James: Menstruation and irregular uterine hemorrhage of ovarian origin. *Brit. Med. Jour.*, p. 1031, (Dec. 20) 1930.
9. Zondek, B.: Quoted by Mazer and Goldstein.

SURGERY IN CHRONIC SINUS DISEASE

FRANK L. BRYANT, M.D.

Instructor in Otolaryngology, University of Minnesota
Minneapolis

I.

PROGRESS in the field of rhinology is keeping pace with the advance in other medical arts and sciences. In the surgical management of chronic sinus disease of marked degree, the criticism by contemporary surgeons is diminishing against the operation known as the external fronto-ethmo-sphenoidectomy. Many rhinologists have reversed their adverse opinions after having observed the patient undergoing this particular operation or after examining one who had been previously operated in this manner.

In many sections of the country one may still witness an extensive intranasal procedure in which the operative field is obscured by blood; the curet and punch guided not by the eye but by imaginary lines projected on the patient's face. The postoperative course, too, is often stormy and sometimes fatal. Last, but far from least, the after-care is sometimes prolonged and extended. This is true if the operator could not be as thorough as he had intended because of hemorrhage, inaccessible periorbital ethmoid cells, or an unusual sphenoid formation. In an attempt to hasten retarded progress the proposal is made of another operation, or even a third or fourth! All of this might have been accomplished originally. Later, if the patient should become discouraged or the doctor disheartened, one is likely to find a "conglomerate mass of hypertrophied and scarred mucosa, fibrous tissue and bone bathed in pus and carpeted by crusts," using the oft repeated words of the late Ross Skillern. If such results were to be considered end-results it is little wonder that family physician or internist is either unwilling to permit or unlikely to agree to such operative procedure.

The general practitioner has not alone shared these views. Many rhinologists throughout the country have been well aware of what their colleagues disapproved. They have been fully cognizant that in early chronic infection of the sinuses involving one circumscribed area a well chosen intranasal procedure with well planned general management would effect a cure.

It is not to these simple cases that I refer, but to those where the infection extends into adjacent sinuses and has become definitely chronic. It is in this large group of patients that results have been neither satisfactory to the patient nor to his doctor. The infection has not only produced marked disease within the sinuses but obvious intranasal changes are in evidence. The nose has essentially ceased in its normal function and instead has become a source of constant trouble to its possessor.

One method of management, medical or surgical, is not a cure-all for any stage or every stage of infection. One should adopt a sensible point of view and employ a procedure suitable and completely adequate to the patient and the existing pathology. The patient should not be subjected to any single type of treatment. Obviously it would be ridiculous to advise a complete and thorough exenteration of all sinuses when only the anterior ethmoidal labyrinth is at fault or even if the patient had recovered from one or two attacks of an acute frontal sinusitis due to enlarged bullar and agger-nasi cells which obstructed the frontonasal duct. By the same token, it would be absurd to advise a conservative intranasal procedure to be used in the hope of curing one who presented an extensive and marked involvement in the frontal, ethmoidal, and sphenoidal sinuses with the middle turbinate greatly hypertrophied and void of function.

I feel the criterion of good judgment can only be gained by a careful estimation of all factors. By all factors I mean a careful history, a complete clinical and laboratory survey, a roentgen-ray, preferably with radio-opaque contrasting media. Then and only then can one determine the most expedient procedure to advise on that particular patient.

It is for the patient with signs and symptoms of pansinusitis of long standing that notable advances in surgery have been made. There is accomplished in this one procedure what formerly required from two to often four or five operations. With this newer method a clinical

cure i
others
It c
line th



Fig.
changes
poid de

Fig.
area (L
and sph
Inner
papyrac

viz:
dacry
usual
cision
the p
then
The
This
a su
throu
moida
middl
the fr
remov
wall
propr
and,
ligate
a co
guard
aceto
to p
rather
down
walls
and
surge

Th
tive o
six v
tected
the "
vocat

CHRONIC SINUS DISEASE—BRYANT

cure in many cases and always marked relief in others can be promised to the patient.

It does not seem out of place to briefly outline the technic used in this so-called procedure,

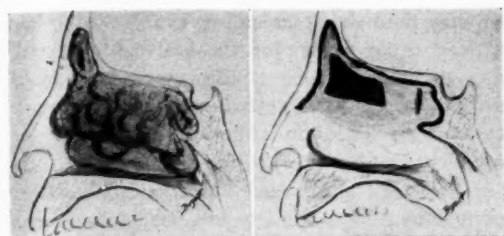


Fig. 1 (left). Lateral nasal wall (adult) showing marked changes in frontal, ethmoidal and sphenoidal sinuses and polypoid degeneration of middle turbinate.

Fig. 2 (right). Lateral nasal wall (adult) showing operated area (bounded by heavy black line). The frontal, ethmoidal and sphenoidal sinuses have been created into a common cavity. Inner rectangular darker area is removed portion of lamina papyracea revealing orbital contents.

viz: an incision similar to that made for a dacryocystectomy is all that is needed for the usual case. By dissection from the line of incision the lamina papyracea is brought into view, the posterior ethmoidal artery is exposed and then put on tension by self-retaining retractors. The artery is ligated with suitable instruments. This in itself is the main factor in permitting a subsequent thorough procedure. Breaking through the lamina papyracea, the entire ethmoidal labyrinth and non-functioning diseased middle turbinate may be removed. The floor of the frontal sinuses and agger-nasi cells are next removed. A splendid view of the entire anterior wall of the sphenoid is then seen. With appropriate punch forceps this wall is removed and, if need be, the spheno-palatine artery is ligated. The curet has no place in this operation; a complete exenteration is accomplished by guarded biting and punch forceps. Picric acid-acetone solution on small gauze balls is used to perfect the toilet of the operative cavity rather than curetting and inadvertently breaking down the protective osteitis present in the bony walls. The entire operation can be easily viewed and the instruments are under control of the surgeon.

This procedure results in minimal postoperative care and hospitalization and in from two to six weeks only a slight linear scar can be detected. This technic is the operation known as the "external fronto-ethmo-sphenoidectomy," advocated by the late Robert Lynch, Sewall, Ferris

Smith and others. True, the operation is somewhat more time-consuming than the intranasal route, but I firmly believe it is better to spend the required time in the operating room in the



Fig. 3 (left): Unretouched photograph of a patient one month after external fronto-ethmoid operation. The horizontal ink lines show extent of original incision.

Fig. 4 (right): Unretouched photograph of a patient five weeks after external fronto-ethmoid operation. The horizontal ink lines show extent of original incision.

ligation of crucial blood vessels to permit complete exenteration under direct vision. The intranasal radical operation, if it were to be done completely, would endanger the life of the patient, and by this fact it would obviate completeness.

Completion of forty operations without fatality or complication constitutes evidence of its safety as contrasted to endeavoring to duplicate this procedure entirely by the endonasal route. Minimal postoperative reaction bespeaks its comparative freedom from surgical trauma. The little postoperative care and rapid healing indicates it is a satisfactory method of dealing with chronic sinus infection.

II.*

The second part of this paper consists of a report of a group of twenty-eight external fronto-ethmo-sphenoidal operations which were done this past year on the Otorhinology service of the University of Minnesota.

No attempt at this time will be made to review the literature or to give the operative tech-

*From the Department of Otolaryngology, University of Minnesota Medical School. Part II of this paper was presented before the Minnesota Academy of Ophthalmology and Otolaryngology in December, 1935.

nic excepting to state that the general plan suggested by Lynch, Sewall and Ferris Smith was followed. In this clinic four stages or grades of chronic sinus infection are recognized. Patients who showed a third or fourth degree involvement, or who had failed to obtain desired or adequate relief from previous treatment and intranasal procedures were advised to have this operation.

In the non-allergic group of fifteen, six of whom had bilateral involvement, the most common persistent complaint was that of purulent discharge. The next, nasal obstruction. Usually it was almost complete and not influenced by intranasal medications. In five it had returned after intranasal operation. Headache was a variable complaint. It was usually present when the patient had an acute flare-up or a prolonged head cold. In one patient the headache assumed such proportions as to provoke suicidal intent and especially when morphia gave no relief. In the allergic group of four, three of whom had bilateral involvement, asthma was the outstanding symptom. Each patient presented both allergic and infective changes in the nose. All patients were observed at intervals so that a true estimate of the extent of their disease could be made.

All patients had complete laboratory and x-ray studies as well as physical examination before this type of operation was done. No patient was operated upon who had a temperature of more than 99.6 or who had had an acute flare-up within the previous two weeks. The group of twenty-eight operations would obviously have been larger if this restriction had not been made but it was felt that this type of operation should not be done with an immediate history of an acute exacerbation.

Preoperative.—A barbiturate was given the night before and the morning of operation. Pantopon gr. $\frac{1}{3}$ was also given by hypodermic the morning of the operation. The nose was packed from two to three times with 2 per cent pantocain and 1-1000 adrenalin in the ratio 2:1. Both the sphenopalatine ganglia through the anterior palatine canal and the periorbital tissues were injected with 1 per cent novocaine. The patients were operated upon in the erect position.

Pathology.—Our findings at operation were usually more extensive than was indicated by

the x-ray report. This was especially true in the periorbital ethmoid cells. Histologic studies showed extensive leukocytic infiltration and fibrosis.

Postoperative.—The patient was instructed not to blow the nose or use the eyes for reading for at least three weeks. On the fourth to the sixth day suction cleansing of the mucus and blood serum coagulum, et cetera, was made. An occasional sterile saline irrigation of the nose was used but not routinely.

Results.—There were no deaths. There were no complications. There was no postoperative hemorrhage either immediate or delayed. One patient had an epistaxis on the seventh day which brought her back to hospital. She had had two previous intranasal operations each with apparently a postoperative hemorrhage which required packing, and was apprehensive about a third. This epistaxis yielded promptly to adrenalin-soaked cotton.

Temperature.—Only one patient showed a postoperative febrile reaction of 101, which was recorded but one time after each of his two operations. The other temperatures ranged from normal to 100.3, rectal readings.

Pain.—Codeine usually was sufficient. Morphia was occasionally given.

Dressing.—A simple head dressing with the eye covered for two or three days sufficed.

Epiphora.—This varied from seven to twenty-eight days.

Diplopia.—Three patients had diplopia for from one to two months. These occurred in our first patients. It was found upon rechecking that they had been allowed to read too soon after the dressings had been removed. With definite restrictions and supervision most patients had very transient diplopia if any at all.

End Results.—The patient with the headache of severe proportion has been relieved (a year has elapsed since her operation). Those with purulent discharge and nasal obstruction were, with the exception of two patients, markedly improved to clinically cured in at least seven. One who complained of frontal headache and purulent discharge had bilateral involvement; he has the other side yet to be operated upon. The other patient who originally complained of recurring polyps, complete nasal obstruction, and headaches has gained relief from the first two complaints but still has periodic headaches. This

is probably due to too conservative handling of the sphenoids. She was the first patient of this series. There has been less frequency of head colds. However, sufficient time has not passed to give final judgment. After periods ranging from two to eight months intranasal inspection revealed a smooth modified mucous membrane covering the operated area. This was free from crusting, purulent discharge or granulation tissue.

In the allergic group there were but four patients. Two of these had had asthma but had had none since their last surgical procedure. One continues to have asthma during and fol-

lowing head colds. She is also sensitive to numerous foods. The fourth is much improved; a bilateral Caldwell-Luc operation is yet to be done on this patient.

The hospitalization averaged from five to six days; some were discharged on the fourth day; one patient was in for a duration of sixteen days.

I am satisfied that this is a most acceptable method after both observing and using various intranasal procedures for chronic sinus infection of marked degree. Robert Lynch commended it to his colleagues when he participated in the symposium on the ethmoid problem. I heartily subscribe to his recommendation.

PRIMARY OPERATION FOR SUPPURATION OF THE PETROUS PYRAMID*

Report of Two Cases

H. L. WILLIAMS, M.D.

Rochester, Minnesota

IN THE literature on the surgical treatment of suppuration of the petrous pyramid, it appears that the curative operation has been secondary because the condition may not have been recognized primarily. As a result of recent stimulation of interest and the voluminous literature on the condition, otologists are now better able to recognize the condition primarily. It seems obvious that a primary operation has great advantage over a secondary operation. The following two cases are illustrative of diagnostic criteria and the results that can be obtained by recognition of pathologic changes in the pyramid and well directed surgical management.

Report of Cases

Case 1.—The first patient, a girl aged twelve years, had had an earache on the right side of five weeks' duration. There was no history of previous upper respiratory infection. She had previously been brought to the clinic at the age of two and a half years when she had had acute mastoiditis on the right. This had cleared up under treatment. Prior to this second visit she had had earache and fever for about a week, when a local physician had been called. He had immediately performed myringotomy on the right. There had been profuse discharge from the ear, which was still draining at the time of the patient's second admission. For four weeks the patient had then had intermittent pain

deep back of the right eye; this pain had become continuous and had been much more severe four days before admission. With the start of this deep post-ocular pain, ptosis of the right lid had developed which had remained constant. Diplopia had also been present, and intermittent vomiting of projectile type had occurred in this period of four weeks. In the last two or three days before admission the patient had noticed some rigidity of the neck.

Examination of the ears, nose, and throat otherwise gave negative results, the right sphenoid, especially, being found clinically to be uninvolved. There was a pulsating discharge from the right ear, but no mastoid tenderness could be elicited, except posteriorly in the region of the mastoid emissary vein, where a very slight tenderness could be elicited on firm pressure. A stapes fixation type of deafness was present on the right side.

Examination of the eyes revealed the fundi to be essentially negative except for mild venous engorgement. There was a mild glial excess of the upper nasal disk margins, slightly more marked on the left. The patient read fine print with the left eye, and with the right also with the aid of a sphere of +5 diopters. The right pupil was larger than the left and was fixed. The reflexes were absent on the right and normal on the left. The visual fields were normal. Complete paralysis of the right third nerve was present, with ptosis, iridoplegia, and cycloplegia. The function of the sixth cranial nerve was apparently normal on both sides. Nystagmus was not present.

Neurologic examination gave negative results except for indicating slight rigidity of the neck and a positive Kernig sign. On puncture, the pressure of the spinal fluid was 27 cm. of water. The spinal fluid was the

*From the Section on Otolaryngology and Rhinology, The Mayo Clinic, Rochester, Minnesota. Read before the Minnesota Academy of Ophthalmology and Otolaryngology, St. Paul, Minnesota, January 10, 1936.

SUPPURATION OF THE PETROUS PYRAMID—WILLIAMS

color of ground glass and was turbid, grade +2. No organisms were found on smear, and there was no growth of organisms or culture in brain broth, blood agar, or chocolate blood agar in twelve hours. There

in the fluid; the fluid was under normal pressure and had a normal appearance. There was slight residual of the paralysis of the third nerve, mostly affecting the power of accommodation. The patient was advised



Fig. 1 (Case 1). The lines of advance of the perilabyrinthine cells may be clearly seen. This is the first case reported in the literature in which the cell line over the labyrinth has been followed.

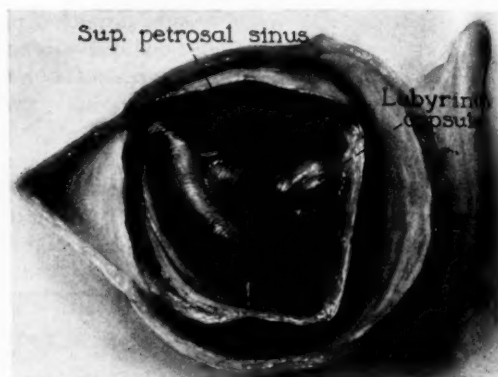


Fig. 2 (Case 2). In this case the labyrinthian capsule was nearly dissected free.

were 1,216 small lymphocytes and 1,600 polymorphonuclear leukocytes per cubic centimeter of fluid.

General physical examination gave essentially negative results. A roentgenogram of the sinuses was reported negative; that of the mastoid process on the left was also reported negative, and that of the mastoid on the right was reported as diffusely cloudy, indicating destruction of the cells over the lateral sinus.

A diagnosis was made of dural irritation secondary to petrositis, and because the smear and culture of the spinal fluid were negative, exploration of the mastoid and petrous pyramid was advised. At operation, the cortex was found to be like ivory and was extremely thick, but, in the region of the antrum, a cavity was found which was about 1.5 cm. in diameter and was filled with pus under pressure. A small parasinus abscess was found midway between the upper and the lower turn. The dura of the middle fossa was uncovered and was found to be normal in appearance. On examination for extensions into the petrous pyramid, a line of cells containing infected granulations was found leading above the capsule of the labyrinth (Fig. 1). The cells were scooped out with a fine curet until firm bone was found at a depth of 1.5 cm., approximately at the medial aspect of the labyrinthine capsule. A similar line of cells was found in the sublabrynthine region and was followed in to approximately the same depth.

The following morning the headache had completely disappeared and the ptosis was less marked. The patient was dismissed in fifteen days with the postauricular wound completely healed. Spinal puncture three days before dismissal revealed fifty-nine small lymphocytes

to have the ocular fundi checked once a month for the next two months.

Case 2.—The second patient, a girl aged eleven years, five weeks before admission to the clinic had had an attack diagnosed as influenza, with sore throat and fever. She had been confined to her home for a week and had then returned to school. A week later she had complained of pain in the right ear; during the night, the ear drum had ruptured spontaneously and the ear had discharged. The patient had continued to have pain about the right mastoid region for about two weeks. She had begun to have attacks of vomiting once or twice a day about a week after the onset of the earache, and these attacks had continued up to the time of her admission. About two weeks after the onset of the earache the patient had begun to complain of pain, deep back of the right eye and in the right frontal region; almost immediately she had had diplopia and photophobia, which were still present at the time of admission. The patient had been free of fever for a week prior to her admission. During the course of the illness she had lost 19 pounds (8.6 kg.).

On admission, there was a thick profuse discharge from the right canal, with marked drooping of the postsuperior wall and concentric narrowing of the external auditory canal medial to the isthmus. No mastoid tenderness could be elicited. There was no evidence of sinusitis, particularly involvement of the right sphenoid.

Examination of the eyes (vision, reflexes, and pupils) gave negative results. Examination of the fundi showed blurring, of about 1 diopter, at the upper and lower margins of the disks, being a little more marked on the left. Paralysis of the right external rectus muscle, graded 2, was found, with homonymous diplopia to the right. Neurologic examination gave evidence of

slight stiffness of the neck and a slightly positive Kernig sign.

Roentgenograms of the sinuses were negative, but a roentgenogram of the skull showed marked cloudiness of the right mastoid. Spinal puncture was performed, and the fluid was found to be clear and to be under a pressure of 13.5 cm. of water; it contained one lymphocyte per cubic millimeter. Smears and cultures of the spinal fluid were negative for organisms. A diagnosis of mastoiditis, with probable epidural abscess, Gradenigo's syndrome, and possible petrositis, was made.

On uncovering the mastoid, it was found that the petrosquamous suture ran very far posteriorly, ending posterior to the tip of the mastoid. The larger part of the mastoid was therefore developed in the squama; it was of the diploic type and was not involved by the disease. On removing the petrosquamous lamina, however, it was found that the petrous portion of the mastoid was much broken down and a large epidural abscess was present. This abscess extended from a point on the lateral sinus about 2 cm. posterior to the upper knee, to the turn of the sigmoid toward the jugular bulb below, and then extended for about 3 cm. over the temporal lobe to the zygomatic root. The petrous portion of the mastoid was removed down to the labyrinthine capsule, about 1.5 cm. of the superior petrosal sinus being uncovered (Fig. 2). A group of cells which extended along the posterosuperior aspect of the labyrinthine capsule to approximately its medial border were exenterated; they seemed to terminate here without advancing to the apex. The wall of the sigmoid sinus was much thickened but on emptying the vein it refilled normally, both from above and below, so it was not opened. The wound was closed in the usual manner.

The patient's headache had disappeared on the following day, and paralysis of the abducens nerve had nearly disappeared. She was dismissed in two weeks, and the ear drum and postauricular wound were completely healed, the abducens nerve was functioning normally, and the fundi were normal.

It is of interest that in the first case sclerosis of the cortex produced by previous mastoid disease was present, whereas in the second case an anomalous condition in which there was a thick petrosquamous lamina may have been the factor that favored deep progression of the disease. This is the first example I have seen of the tip of the mastoid being formed by the squama.

Comment

The first observation on suppuration of the petrous pyramid was made by Bärckner in 1883. Muck in 1900 reported the first operative cure by the procedure of following fistulous tracts on the anterior and posterior aspects of the labyrinthine capsule. Goris in 1903 explored the petrous

apex by the subdural route and removed a large sequestrum of the apex. Moure, a year later, followed a fistulous tract behind the labyrinthine capsule and also secured a cure. Combiér, in 1909, reported a cure secured in the same manner, as did Levesque in 1912. Holmgren in 1922 secured recovery by draining the apex after performing labyrinthectomy. O. Mayer reported a cure by following a fistulous tract above the eustachian tube after exploration by the subdural route had been ineffective.

In 1931 Kopetzky and Almour reported the cure of four of eight patients who were operated on by his technic. His paper was epochal in that it produced marked stimulation of interest in petrositis in this country, and since that time the number of reports on the condition has shown a very marked increase. This paper was the first in this country to suggest that a definite syndrome, which made early recognition possible, accompanied the lesion, and that surgical attack offered more than a forlorn hope. Kopetzky deserves the greater credit in that he was apparently unaware of the pioneer work of the French surgeons and based his work on reports at necropsy and anatomic descriptions in the German literature, which were extremely incomplete.

The fundamental anatomic investigations were carried out in 1904 and in 1906 by Mouret and Lafitte-Dupont in their researches on the cellular structure of the petrous pyramid, although Urbantschitsch had noted peritubal cells leading to the apex as early as 1890. These investigations were followed in 1908 by Baldenweck's remarkable thesis for his doctorate in medicine. He organized the clinical and anatomic observations made up to that time, suggested the proper diagnostic criteria and surgical attack, and produced almost by his unaided efforts an article superior, especially in his surgical recommendations, to any published even up to the present time.

Baldenweck defined the petrous apex as that part of the pyramid medial to the labyrinthine capsule, and we accept this definition in our discussion. He described the petrous apex grossly as made up of three types: the cellular, the diploic, and the sclerotic, or of any combination of the three. He described its gross appearance as a hard central core surrounded by finer bony trabeculae fanning out to the cortex. Following

Mouret and Lafitte-Dupont, he described the six lines of cells which might invade the petrous apex around the periphery of the labyrinthine capsule. He expanded knowledge of the relation of the petrosphenoidal ligament to the abducens nerve in forming Dorello's canal, and he noted the close relationship of the gasserian ganglion and the carotid and cavernous sinus to the petrous apex. He also called attention to the relationship of the oculomotor nerve to the carotid artery, that of the base of the petrous pyramid to the vault of the nasopharynx, and that of the canaliculus hiatus subarcuatus to the posterior avenues of perilyabyrinthine cells. He also mentioned the possible rôle played by the greater superficial petrosal nerve in producing the pain of petrositis.

The symptoms of disease of the petrous pyramid do not depend on disease of the bone itself but on irritation and invasion of certain contiguous structures, as has been demonstrated at the clinic by two cases of symptomless petrositis discovered in the course of complete (simple) mastoidectomy.

The structures most frequently involved in disease of the petrous apex are the gasserian ganglion and the superficial petrosal nerve. Eagleton has demonstrated that the first division of the fifth cranial nerve is bound by fibrous bands to the underlying dura and bone, and he was of the opinion that it is this factor that produces the deep retro-ocular pain often seen in the condition. Pain in the second and third divisions of this nerve has also been noted in connection with petrositis, and trismus associated with irritation of the motor root has likewise been noted. Vail maintained that retro-ocular pain is caused solely by irritation of the greater superficial petrosal nerve in its course along the anterior surface of the petrous pyramid. I have observed a case in which retro-ocular pain was the only symptom present, with anesthesia and ulceration of the cornea; Brunner has said that corneal anesthesia is characteristic of petrositis, so it seems probable that vidian irritation is a factor in the production of pain. The recurrent nerve of Arnold, a branch of the ophthalmic nerve supplying the dura of the region, has also been implicated. It would probably be a more logical position if one would assume that any of these structures, when irritated, could produce the

symptom which, according to Kopetzky, is characteristic of the disease. That deep retro-ocular pain is not an invariable symptom is shown by Ramadier; this symptom occurred in only thirty-two of fifty-seven cases reviewed by him. However, as Ramadier remarked, some type of referred pain is the most frequent symptom of petrositis.

The symptom second in importance is paralysis of cranial nerves. Paralysis of the abducens nerve is the most constant, and Baldenweck was of the opinion that while toxic neuritis, or the localized dural irritation of Gradenigo, may in some instances be responsible, the most common cause is suppuration of the petrous apex. Baldenweck also noted the occasional association of paralysis of the oculomotor nerve with petrositis, and Atkinson thought it was the result of a generalized swelling in the region, pressing the nerve against the carotid artery. Paresis of the facial nerve has also been noted in association with petrositis, but not as often as might be expected because of the position of the nerve in the center of the pyramid. This resistance may be attributable to the hard, bony facial canal and the good blood supply from the auditory artery.

An abscess pointing in the vault of the nasopharynx may be the only sign of petrositis in diseases of the sublabrynthine line of cells, and it is indicative of involvement of the inferior portion of the pyramid. Baldenweck was of the opinion that cavernous sinus thrombosis in association with mastoid disease was usually caused by suppuration of the petrous apex.

Signs of meningeal irritation are common in association with petrosal suppuration, and an eventually fatal outcome is usually ushered in with explosion of a suppurative meningitis. Examination of the spinal fluid should always be done when petrositis is suspected. Even if large numbers of polymorphonuclear leukocytes are found, if the smear and culture of the fluid are negative, serous meningitis may be assumed and operative intervention may be successful. The diagnostic symptom of least value is a temperature indicating a septic course, and, while the temperature is sometimes elevated, it may be normal until the start of meningitis or cavernous sinus thrombosis.

The symptoms of petrositis may appear at any time during the course of the disease, sometimes

as one of the initial symptoms, occasionally not until several weeks after apparently complete mastoidectomy.

In regard to evaluation of symptoms and the proper procedure to adopt, Baldenweck said:

"In our opinion, if one is correct in suspecting an osteitis of the petrous pyramid, one may think of it as possible or probable, but certainty can never be actually acquired. It is possible if one of the following symptoms appears: paralysis of the iii and especially of the vi, and signs of serious irritation of the trigeminal. It is probable if these signs are associated with one another, to a peripharyngeal collection, to deep pains, or to signs of retention of pus. The appearance of a thrombosis of the cavernous sinus may lead to confusion because of the paralysis which it may cause, but may itself be due to an osteitis of the petrous apex. When and how should one intervene? The wisest course appears to us not to carry to a conclusion an intervention against the petrous apex but to operate in two stages. On the first occasion, one should make a very large radical; one should follow the lesions, if they are there, as far as possible; one should uncover systematically and to a sufficient extent the elbow of the lateral sinus and the dura mater in the region of the tegmen. If definite lesions lead up to the apex one should follow them while taking care not to injure the carotid, the vii and the cavernous sinus. It is better not to open the dura mater, which appears difficult to us because it is often adherent and softened. If the radical and the different explorations mentioned remain without result; if free drainage has not been assured; if the symptoms persist, one would be authorized before the explosion of meningeal or cerebral complications to uncover the apex (by the subdural route)."

This advice, with some technical modifications, is that followed at the clinic, and it was worked out independently before we had the privilege of reading Baldenweck's paper.

Eagleton in 1930 advised a procedure which he characterized as "unlocking the petrous apex" in which, after doing a wide decompression by removing the bone about the zygomatic root, and the bone over the sigmoid (the anterior and posterior buttresses) together with the bone over the temporal fossa, he elevated the temporal lobe and opened the apex with a hook. In cases in which serous or suppurative meningitis was present, he advised incision of the dura and drainage of the basal cisterns. I cannot agree that opening the dura, especially when a serous meningitis is present, is good surgical practice, although the exposure of the field in Eagleton's approach is excellent, especially if combined with ventricular drainage. The latter, I think, is con-

traindicated if there is any possibility that organisms are present in the cerebrospinal fluid. Later in the same year Kopetzky published a report of his technic in which, after radical mastoidectomy, he introduced a burr in the region of the zygomatic root and advanced it into the petrous pyramid between the carotid artery, the cochlea, and the surface of the pyramid with its dural covering. Myerson, Rubin, and Gilbert pointed out the danger of this surgical approach and suggested a subdural approach, with removal of the wall of the petrous pyramid just beyond the labyrinthine capsule. Ramadier suggested an approach to the petrous pyramid beneath the knee of the carotid artery, after flattening out the tympanic bone and exposing the ascending limb of the carotid artery. This approach is somewhat similar to Kopetzky's, but proceeds according to correct surgical principles.

In a paper published in 1932, Lillie and I advised following the diseased cellular tracts in their course around the labyrinthine capsule. It is our opinion that radical mastoidectomy is rarely necessary, as even when one of the fistulous tracts enters the pyramid by way of the hypotympanum or pericarotid region, other tracts will probably be present by which the infected pyramid can be drained. If sufficient drainage cannot be secured in this manner, after a sufficient interval we believe the petrous pyramid should be drained, after the manner of Eagleton or Ramadier.

In following this procedure we have had but two deaths in seventeen cases of petrositis: one of a patient who had cavernous sinus thrombosis at the time of his admission to the clinic; the other of a patient with severe diabetes who died of pneumonia (type II pneumonococci) although a pure culture of hemolytic streptococci had been secured from the mastoid.

We therefore feel that this relatively conservative procedure in cases of petrositis will secure the best results.

Bibliography

1. Atkinson, E. M.: Abscess of the brain: its pathology, diagnosis and treatment. London: Medical Publications, Ltd., 1934, 289 pp.
2. Baldenweck, Louis: Etude anatomique et clinique sur les relations de l'oreille moyenne avec la pointe du rocher le ganglion de gasser et la Vie Paire cranienne. Paris: G. Steinheil, 1908, 209 pp.
3. Brunner: Quoted by Ramadier.
4. Bärckner, K.: Drei Fälle von tödlich verlaufenen Ohrleiden, nebst Beiträgen zur pathologischen Anatomie des Gehörorgans. Arch. f. Ohrenh., 19:245-256, 1882-1883.
5. Combiar: Quoted by Ramadier.
6. Eagleton, W. P.: Localized bulbar cisterna (pontile) meningitis, facial pain and sixth nerve paralysis and their re-

ACUTE INTESTINAL OBSTRUCTION—QUIST

- lation to caries of the petrous apex. Arch. Surg., 20:386-420, (Mar.) 1930.
7. Goris: Un cas de chirurgie cérébrale pour complication d'otite moyenne chronique; guérison. Ann. d. mal. de l'oreille du larynx, 29:64-68, 1903.
8. Holmgren, Gunnar: A case of Gradenigo's syndrome. Acta otolaryngol., 4:491-492, 1922.
9. Kopetzky, S. J., and Almour, Ralph: The suppuration of the petrous pyramid: pathology, symptomatology and surgical treatment. Ann. Otol., Rhinol., and Laryngol., 39: 996-1016, (Dec.) 1930; 40:157-177, (Mar.); 396-414, (June) 1931.
10. Lafitte-Dupont: Quoted by Baldenweck.
11. Levesque: Quoted by Ramadier.
12. Lillie, H. I., and Williams, H. L.: Suppuration of the petrous pyramid: report of two cases. Arch. Otolaryngol., 15:692-696, (May) 1932.
13. Mayer, O.: Gradenigoscher Symptomkomplex: operative Freilegung. Monatschr. f. Ohrenh., 970, 1929.
14. Moure, E. J.: Quoted by Ramadier.
15. Mouret, J.: Zone pétruse intersusino-auditive: voie de propagation des suppurations de l'oreille moyenne dans la fosse cérébelleuse. Presse otolaryngol. belge, 8:353-362, 1909.
16. Muck: Quoted by Baldenweck.
17. Myerson, M. C., Rubin, H. W., and Gilbert, J. G.: Improved operative technic for suppuration of the petrous apex. Arch. Otolaryngol., 19:699-703, (June) 1934.
18. Ramadier, J.: Les ostéites profondes du rocher (Pétrosite-rochérte). Société Française d'Oto.-Rhino.-Laryngol. Paris, Chantenay. 46:1-178, 1933.
19. Urbantschitsch, Victor: Ueber die vom Gehörorgane auf den motorischen Apparat des Auges Stattfindenden Reflexwirkungen. Wien. klin. Wchnschr., 9:1-3, (Jan.) 1895.
20. Vail, H. H.: Vidian neuralgia with special reference to eye and orbital pain in suppuration of the petrous apex. Arch. Otolaryngol., 17:212-221, (Feb.) 1933.

DIAGNOSIS AND TREATMENT OF ACUTE INTESTINAL OBSTRUCTION

HENRY W. QUIST, M.D., F.A.C.S.

Minneapolis

IT IS fortunate that most conditions we are called upon to treat do not demand an immediate diagnosis. However, there are a few conditions in which early diagnosis is of the greatest importance and one of these is acute intestinal obstruction. In private practice we do not see a case very often and very few during an entire lifetime; consequently, when confronted with a case we lack the experience and may not be prepared to treat it properly.

I have nothing new to offer on this subject, but I think it is advisable for us all to exchange our experiences and benefit from each other's success or failure. There has been a great deal written on this subject the last few years, both on clinical and experimental investigation. We are indebted to Dr. Wangenstein of the University of Minnesota for the valuable work he has contributed to this subject. His device for relieving gastric distress and distension by the duodenal suction tube is a godsend to every patient suffering from this complication following operation or in paralytic ileus.

The discussion of this subject is based on information gained from a study of literature and from clinical observation.

Mortality.—Deaver¹ placed the mortality in intestinal obstruction at 50 per cent. Miller² of New Orleans reported 209 deaths in 343 surgical cases, a mortality of 60 per cent. Fey and Cubbins³ report an analysis of 241 cases at Cook County Hospital, from 1921 to 1931, with 103 deaths or 42.7 per cent mortality.

Causes.—Moore estimates that 65 to 70 per cent of intestinal obstruction is due to paralytic or dynamic causes. Strangulated hernia, post-operative adhesions and bands, and intussusception contribute mechanical causes. Peritonitis is responsible for certain cases.

Symptoms and Diagnosis.—Sudden, severe abdominal pain is the first and important symptom. At first the pain is paroxysmal and later continuous. It is the red flag of danger and if this signal is knocked down by giving morphine before diagnosis is made, the patient will rest in false security and mislead the doctor.

Deaver once said, "Not to give morphine after diagnosis is made is inhuman, but to give before the patient has been carefully examined from every angle is unpardonable." He modifies this statement by saying it may be advisable to give one dose.

The history of previous operations, especially that for a perforated appendix, is very helpful in making a diagnosis.

Obstruction due to intussusception differs from other forms in that it generally occurs in children under two years and is very rare in an adult. The cardinal symptoms and signs are sudden, severe pain in the abdomen, vomiting, very rapid exhaustion, bloody mucus, and later the development of a tumor in the abdomen, usually on the right side but which may extend across to the left side.

Patients with a complete obstruction from the beginning are not difficult to diagnose. Be-

cause of the continuous pain they will demand relief and unless this is done by morphine it must be done by surgery.

Nausea and vomiting are always present at the onset, but if nothing is taken by mouth it may be absent after the initial attack until the late stage.

The fact that the bowels have not moved and no result is obtained by an enema is generally considered a sign of acute obstruction. Therefore, a bowel movement prior to or immediately after the onset of symptoms might lead one to believe obstruction was not present.

Wangensteen has shown in experiment on dogs that the bowel may evacuate itself below the obstruction after an enema. He has made the same clinical observation.

Abdominal distention is always present but may be absent at the onset; therefore, its absence in the early stage might be misleading.

Increased peristalsis is always present in mechanical obstruction, but it is not present in paralytic ileus. Its presence may be indicated by gurgling sounds heard on auscultation. In high obstruction it may be heard only in the upper abdomen. If the peristaltic sounds are diminished or absent, this is regarded as evidence that a severe injury to the bowel has taken place. Personally, I have found that this is not always a correct conclusion.

Rigidity and tenderness are usually present, but not definitely localized.

Dehydration and hypochloremia are always present in obstruction, depending in degree upon how much the patient has vomited. Wangenstein and Chunn⁸ reported a case in which there was a loss of 6,000 c.c. of fluid in twenty-four hours. Life cannot exist without chlorides. Dr. Primrose of the University of Toronto has said that if the blood chlorides fall below 450 mgm. per 100 c.c., peristalsis is inhibited. With the reduction of chlorides there is an increase of non-protein nitrogen. It has been shown by experiments that the higher the obstruction the greater is this imbalance of the blood chemistry and the more serious the prognosis. That absorption of toxin is not the only factor is shown by the fact that the lower the obstruction, in which case there is more area for absorption, the less serious the symptoms.

There is very little rise in temperature and

pulse to help in making a diagnosis until later in the course, when a fatal termination is approached.

There may be an increase in the leukocyte count in obstruction, but this is not to be depended upon in making a diagnosis.

X-ray.—X-ray is a valuable aid in diagnosis. The film should be made without giving patient any barium, and if gas is found in the small intestine, it is an indication that obstruction is present. If the obstruction is high in the jejunum, barium may be given by mouth in order to determine the location and confirm the diagnosis. This was done in one case and a brief history of this case will be given later. Obstruction cannot be excluded even though no gas is seen in the small bowel on the x-ray film.

Treatment.—Operation is the only treatment for obstruction and the earlier this is done the better is the prognosis. However, of more importance than early operation is the preparation of the patient to overcome dehydration and hypochloremia. This should be done by the administration of 10 per cent glucose in normal saline solution, intravenously. If the chlorides are very low the strength of the saline may be increased or it may be given interstitially or per rectum. The glucose, by its diuretic action, will aid in the reduction of non-protein nitrogen and will furnish energy.

To rush the patient to the operating room without proper preparation is bad surgery. A few hours delay required to give saline and glucose solution and emptying the stomach by lavage or nasal suction is of greatest importance.

The duodenal suction tube gives such wonderful relief in postoperative distention and in a suspected case of obstruction that it might be misleading when obstruction is present. I have had this experience in two cases.

I have used both local and general anesthesia, but I have never used spinal anesthesia in these cases.

The object of operation is to relieve the obstruction. The question may arise, "How should it be done and how extensive an operation should be done?" This depends upon the condition of the patient. If the patient is seriously ill, an enterostomy is recommended; that is, a tube is introduced into the proximal distended

bowel. This was first used by Bonney, in 1916, and later modified by C. H. Mayo by bringing the tube through a piece of omentum. This might be done when there is a large section of bowel involved even if the obstruction is relieved. There are those who doubt the value of the enterostomy tube. Orr and Harden published a paper in 1929 after reviewing the literature on clinical experience and experiment and concluded "that it is of no value when there is a general peritonitis with fluid. In selected case of peritonitis of the lower abdomen, enterostomy is life-saving."

The postoperative treatment is just as important as the preoperative. If the patient is weak and in danger of shock, I have found strychnine very valuable. Glucose and chloride solution should be continued until the patient can take fluid by mouth without any distress or distension. After the operation the bowels will be more or less paralyzed from the added injury due to handling; therefore, they should be kept at rest. This will remove the gas and the patient may be permitted to take some water to satisfy the thirst. Later the tube may be clamped off for short intervals, but the bowels should not be permitted to become distended.

In order to illustrate and emphasize the diagnosis and treatment of this condition, I wish to give a brief history of a few cases that have come under my observation.

Acute Obstruction Following Herniotomy.—A man, aged sixty-seven, operated on for left inguinal hernia, on April 5, 1924, developed severe abdominal pain, distress and marked distention, and on the fourth day after the operation it was apparent that he had an acute obstruction and was operated upon. The descending colon was greatly distended. A colostomy was made, but following the operation his temperature and pulse went up and he died in twenty-four hours.

A post-mortem showed that he had adhesions of the bowel to the peritoneum and on pulling the sac down and tying it off it produced a kink. I think he could have been saved by giving chloride solution intravenously and an enterostomy should have been made.

Obstruction with Enterostomy.—Following an operation for ectopic pregnancy and salpingitis, the patient's condition became very critical and on the fourth day an enterostomy tube was introduced under local anesthesia.

The second case was that of a woman, aged seventy-two, who had pain, vomiting and distention for six days when first seen. She was opened under local anesthesia. The bowel was greatly distended and an

abscess in right iliac region was found, no doubt due to a perforated appendix. A tube was introduced and the abscess drained.

The third case followed a hysterectomy. The patient had a great deal of pain, gastric distress and vomiting after operation and on the sixth day she was re-opened. Obstruction was found near the ileocecal region, probably due to adhesions from a previous appendectomy and brought on by the operation. The obstruction was relieved, but because a large section of bowel was distended, an enterostomy tube was introduced for safety.

Postoperative Adhesions.—A woman, aged thirty-two, who had had three previous abdominal operations, had severe abdominal pain and vomiting. Morphine was given but the pain returned. Operation was performed twenty-two hours after onset. An adhesion of the ileum to a small ovarian cyst was found.

A man, aged thirty, who had had an appendectomy in 1918 complained of severe abdominal pain and vomiting. Morphine was given but the pain returned. At operation, twelve hours after the onset, a peritoneal band from the mesentery was found around the intestine.

There was one case in which operation was delayed because pain did not return after one dose of morphine. This patient, a woman of fifty-four years had been operated upon for a perforated appendix in 1930. She complained of pain and vomiting, but the bowels had moved. On removal to the hospital, thirty hours after the onset, the symptoms were so relieved by gastric lavage and a duodenal suction tube that no more morphine was required. Symptoms, however, returned and the patient became critically ill on the third day. On operation under local anesthesia an obstructing band was found crossing the ileum. In this case the duodenal suction tube was continued too long and misled me in the diagnosis.

Complete recovery in the above six cases.

Intussusception.—On August 16, 1923, a nine-months old boy was seen at the office. He had been vomiting and was restless and crying and blood was found in the stool. His temperature was 100 degrees. A barium enema was given at the office and the symptoms subsided.

The same symptoms returned on August 30 and again subsided.

On September 3, with a return of symptoms, the baby was sent to the hospital for diagnosis. The abdomen was not tender, was soft, and no tumor was felt.

On September 4, Dr. Chester Stewart was called in consultation. The child was vomiting a greenish fluid and passing bloody stools. A tumor was palpable on the right side and the x-ray examination showed an obstruction at the splenic flexure of the colon. Saline was given hypodermically and operation per the last attack. The appendix and ileum were found invaginated into the cecum and colon as far as the splenic flexure. This intussusception was reduced and stools and gas were passed the next morning. After

ACUTE INTESTINAL OBSTRUCTION—QUIST

a stormy two days during which the temperature reached 105 degrees and the pulse 150, recovery followed and the infant was sent home the sixth day after operation.

side. The rest of the abdomen was soft and there was no tenderness. I concluded she must have had a hemorrhage from a duodenal ulcer, but was unable to explain this tumor. A possible diagnosis was a



Fig. 1. A woman, aged thirty-five, with obstruction high in the jejunum. After barium given by mouth.



Fig. 2. Six hours later. Complete obstruction in the jejunum.

Intussusception in an adult is very rare and as I have not been able to find a case reported where it occurred high in the jejunum, I desire to report the case of a married woman, thirty-five years of age, who was seen August 14, 1934. She had had a sudden continuous pain in the epigastrium, with chills, and had a marked rigidity and tenderness over the right hypochondrium. Temperature and pulse were normal and two doses of morphine were required for relief. A diagnosis of gallstone colic was made. X-ray of the gallbladder in 1929 had shown good function and there had been no previous operations.

On the night of February 14, 1935, the patient had a similar attack which was relieved by morphine.

On the night of February 22, her husband called me by telephone, saying that his wife was having another attack. I ordered her to the hospital. There was no doubt in my mind but that she had gallstones. On admittance to the hospital, morphine was given and glucose administered intravenously.

After the examination, in the hospital the following morning, I was positive that the patient had gallstones. Temperature and pulse were again normal. Her general condition was good and she did not have much pain. She vomited some during the day. An enema was effectual.

The hospital interne called me at 5:00 a. m., February 24, and said the patient had passed some bloody stools. He found a mass on the left upper side of abdomen. I went down to the hospital immediately. I found a circumscribed tender mass on the left upper

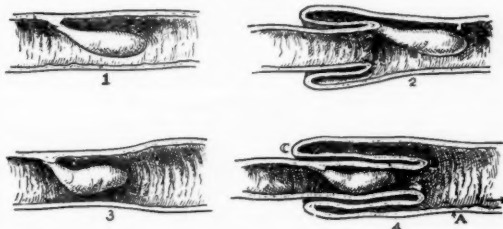


Fig. 3. Intussusception. Two methods by which a tumor may cause invagination. The lettering indicates the parts of an intussusception: A, the sheath; B, the apex of the intussuscepted loop; C, the neck of the intussusception.

tumor of the left kidney that had been overlooked on previous examination. She continued to have pain and a great deal of vomiting and required morphine. She was kept up by glucose and saline solutions.

In order to determine if this tumor was in the kidney an intravenous urography was made on February 26. Dr. Nordin reported the kidneys normal, but said there was a suggestion of partial obstruction of the bowel.

On February 27, an x-ray was taken which showed complete obstruction high up in the jejunum.

Dr. James Johnson was called in consultation. Her temperature had been around 100 and pulse between 80 and 100 since she entered the hospital.

Operation was performed five days after she entered the hospital. Glucose was given before the operation. Six hundred c.c. acacia solution was given during the

VARICOSE VEINS OF BROAD LIGAMENTS—MATTSON

operation and blood transfusion following. Intussusception of the upper part of the jejunum with marked discoloration and inflammation was found. The tumor mass, which was about 12 inches in diameter, was resected, and a lateral anastomosis was made.

The pathologist reported a "papillary type of growth with necrosis and very vascular and degenerated polyp in the wall of jejunum." Strychnine sulphate in 1/30 grain doses was given every four hours. Glucose and saline solution and nasal suction continued until the fifth day after operation.

Complete recovery occurred and the patient was discharged on the twenty-first day after operation. She has had no more gallbladder attacks.

Summary

1. Pain is the first and most reliable sign of acute obstruction. Morphine should not be given until the diagnosis is made; at least, not the second dose.

2. The earlier the operation the better the prognosis, but of greater importance is the giving of saline solution before and after operation to prevent dehydration and hypochloremia.

3. Glucose, in 10 to 20 per cent solution, should be given to furnish energy.

4. Enterostomy should be performed if the patient is in a serious condition, in order to relieve the distention and to drain the toxic fluid present in the bowel.

Bibliography

1. Deaver, J. B.: Intestinal obstruction. *Ann. Surg.*, 83:571-582, 1926.
2. Ellis, J. W.: Cause of death in high intestinal obstruction. *Ann. Surg.*, 75:429-448, 1922.
3. Fey, Amos, and Cubbins, William R.: Acute mechanical intestinal obstruction: Mortality with and without enterostomies. *Surg., Gynec. and Obst.*, 60:738-745, 1935.
4. Haden, T. G., and Orr, R. M.: Reducing the surgical risk in acute intestinal obstruction. *Am. Jour. Surg.*, 39: 108 (Supp. C.), (Oct.) 1925.
5. Miller, C. J.: Study of 343 surgical cases of intestinal obstruction. *Ann. Surg.*, 89:41, 1929.
6. Orr, Thomas G.: Recent advances in the treatment of intestinal obstruction. *Interstate Post Grad. Med. Assn. of N. A., Atlanta Proceedings*, p. 54, 1928.
7. Primrose, Alexander: The treatment of intestinal obstruction by the general practitioner. *Interstate Post Grad. Med. Assn. of N. A., Detroit Proceedings*, p. 311, 1929.
8. Wangenstein, O. H., and Chunn, S. S.: Studies in intestinal obstruction: comparison of toxicity of normal and obstructed intestinal content. *Arch. Surg.*, 16:606-614, 1928.
9. Wangenstein, O. H., and Goehl, Reinhold, O.: Evaluation of the expulsion of enemata as a criterion of intestinal obstruction. *Arch. Int. Med.*, 46:660, 1930.

VARICOSE VEINS OF THE BROAD LIGAMENTS

CARL H. MATTSON, M.D.

Saint Paul

THERE are several seasons for presenting this subject, the main one being that in our experience varicose veins of the broad ligaments are encountered far more frequently, when looked for, than textbooks and gynecological literature would indicate, and further, they seem to be responsible for more disability than has generally been supposed. In several cases, in fact, we have found them to be apparently the sole cause for bitter complaints of pelvic distress, and by doing nothing more than obliterating these veins, we have been able to completely relieve the symptoms. We feel, therefore, that it is timely to discuss this condition, bringing it to your attention so that it may be borne in mind when diagnosing and treating women with pelvic complaints, for, unless thought of, it is very easily overlooked. Unless corrected, complete relief will not be secured, and if allowed to go on it leads to other still more disabling disease.

The literature on the subject dates back to 1854, when Richet¹⁰ reported a case of "Tubo-

ovarian Varicocele." The first American case was reported by Dwight⁶ in 1877. Dudley⁵ in 1888 gave a classical discussion of varicocele of the broad ligament and reported four cases. Eight cases were reported by Miller and Kannel¹⁵ in 1905. An operative technic (the so-called "Argentine operation") was described by Castano^{1,2} in 1926. Emge in two papers in 1921 and 1925 gave a good anatomical discussion^{7,8} and reported fifty-nine cases. Darnall⁴ in 1914 reported six cases. There are in addition to these papers a few scattered case reports and discussions.^{3, 9, 10, 11, 12, 13, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25} The subject receives scant consideration in the textbooks, being limited to short paragraphs in one or two of the standard texts. Part of the purpose of this paper is to report data on twenty-five cases.

In discussing this subject, it is necessary to understand the anatomical considerations⁷ involved. Venous drainage of the pelvis is obtained through five plexi of veins: the vaginal, uterine and hemorrhoidal, which all drain into

the inferior hypogastric veins, and the two pampiniform plexi which empty through the ovarian veins. The right ovarian vein empties directly into the vena cava, the left into the left renal vein. There is only one valve in this system, that at the end of the right ovarian vein.

The support of the pampiniform vessels is very poor, the only real support being at the uterine ends, the ovarian ends hanging free like a hammock, the only fixation occurring higher, at the point where the ovarian vein passes over the pelvic brim. There are two portions to each plexus, one above and one below the hilus of the ovary. The lower half is very tortuous and consists of numerous branches. The support for these veins is poor in connective tissue and contains practically no muscle fibers. Where the pampiniform plexus empties into the ovarian vein there is for a distance of 7 to 9 cm. no support except for the two thin layers of peritoneum. When the body is erect the lower third of the ovarian vein forms an inverted parabola, the upper two-thirds rising vertically to the vena cava on the right and the renal vein on the left side. There is some protection from back pressure on the right, due to the single valve at the vena cava. The absence of a valve on the left side, together with the fact that the left ovarian vein empties into the left renal vein at a right angle may account for an increased back pressure and the greater frequency of varicosities on the left side.

Considering the above facts, the mechanism of the formation of varicosities may be formulated as follows: If for any reason there is congestion in the ovarian circulation the veins, because they have practically no support, must dilate. This distension takes place first at the lowest point of the inverted parabola of the ovarian vein because here two antagonistic physical forces meet, the weight of the column of blood rising vertically and the driving force of the increased column of blood coming from the other direction. The weight of the vertical column overcomes the driving force because the latter is weakened by the compensatory distension of the venous channels. With progressive distention, the other units of the pampiniform plexus are gradually affected, until ultimately the uterine and other plexi are involved also by virtue of their intimate relation through the

anastomotic uterine veins. In long-standing varicose veins there obtains a passive congestion of the pelvic organs. The ovaries are first affected, showing fibrous and cystic changes. This may be an etiologic factor in the so-called "sclerocystic" ovaries that we see. Later the uterus becomes involved, the endometrium becoming edematous and hyperplastic, the cervix hypertrophies and later the fundus also, giving us the so-called fibrosed uterus.⁷

Histologically, the "characteristic feature of the varicocele is the lesion of the vein wall, extending over the three layers of the vein, which is filled with sclerotic tissue from the endo-vein up to the middle part. This sclerotic tissue encircles the vein and produces a sort of periphlebitis, which involves the adjacent nerves, and here we have the explanation of the pains, the neuritis of varicocele."²

Etiologic factors are divided into predisposing and active. The predisposing causes are: (1) the anatomic peculiarities of the pelvic venous system already mentioned; (2) visceroptosis; (3) poor general health with impaired muscular tonus.

Among active causes pregnancy with subinvolution and pelvic engorgement is given the most prominent place. Twenty-one of our twenty-five patients were married and eighteen had borne an average of two children each. All of us have probably observed, during cesarean section, the engorged condition of these veins, and can easily imagine that, if subinvolution occurs and this distension persists, permanent dilatation can easily result. Retroversions, pelvic tumors, obstipation with straining, prolonged and oft-repeated sexual excitement (particularly when unsatisfied), and finally, any factor causing increased intraabdominal pressure may also produce the same effect. We have not seen them in connection with prolapse of the uterus. Syphilis, considered by Castano³ a major cause, has been absolutely inoperative in our cases.

There are no symptoms definitely pathognomonic of this condition. In our experience and that of others who report, history and examination have resulted in diagnoses of ovarian cyst, salpingitis, pelvic inflammatory disease and even ectopic pregnancy. The chief complaint usually made is that of pain, which is of a dull, deep, aching, often burning character, located usually

on the left side, present low in front and in back. The pain is aggravated by long standing, and relieved by lying down or assuming the knee-chest position. It is usually worse just before menstruation. Another common complaint is that of leukorrhea, most commonly of the hydrorrhea type. There is also often a change in the menstrual cycle, the interval at first being shortened and then prolonged, the flow becoming more profuse. These women are usually of a nervous, melancholic disposition. Darnall,⁴ in his paper, says: "We must remember that there is a reason for almost every physical discomfort if we can but run it down, and there is a reason for the child-bearing woman who vainly goes from one physician to another with aching pains in the pelvis and back, dragging sensation worse on standing and walking and worse at the menstrual period, and suffering from all the symptoms of pelvic engorgement and pelvic irritation, although the examining physician may not be able to palpate anything on physical examination on which to base a diagnosis."

The physical findings are few in view of the bitterness of the complaints. There is no abdominal rigidity, no tenderness over the sacrum. No definite masses are felt in the adnexal regions, there being at best just a sense of boggy. There is, however, in spite of the negative findings, extreme tenderness on palpating the adnexal regions. The diagnosis, therefore, must be made by exclusion. In the absence of cervical infection, and given the symptoms of almost any of the pelvic conditions associated with enlargement of one of the organs, and not finding any masses, but only tenderness, a diagnosis of varicosities of the broad ligament can be entertained. Having the patient sit or stand after she has been examined in the horizontal position, and keeping the fingers in place, has been advocated. One is supposed to be able to feel the veins balloon out. In our hands this procedure has not been of definite help. On the operating table, the broad ligaments must be examined before the Trendelenburg position is assumed, as the veins will then empty. When dilated they are very easily identified, looking and feeling just like a scrotal varicocele, the analogous condition in the male.

The only treatment of any benefit is surgical. Palliative measures such as hot douches, glycerine

tampons, frequent assumption of the knee-chest position, etc., have been tried with no definite relief. Surgical treatment advocated varies from conservative measures such as ligation of the engorged veins, and of ventral suspension of the uterus, to radical procedures like removal of the ovaries, tubes and broad ligaments. Castano² has described an operation in which he strips the peritoneum from the utero-ovarian vein at the ilio-ovarian ligament, doubly ligates the vein and then severs it. In our cases we have usually employed multiple ligation when no other abnormality was found, and have obtained complete relief of symptoms.

TABLE I

Symptoms	
Lower Abdominal Pain.....	16
Leukorrhea	14
Lower Back Pain.....	13
Sense of Weight in Pelvis.....	13
Dysmenorrhea	11
Pain Worse Upon Activity.....	9
Metrorrhagia	9
Irregular Periods	7
Pain Down Legs.....	6
Pelvic Findings	
Tenderness in Adnexa Without Definite Mass.....	12
Tender Cystic Mass.....	8
Retroversion	5
Pre-operative Diagnosis	
Ovarian Cyst	7
Chronic Salpingitis	6
Chronic Appendicitis.....	6
Acute Appendicitis.....	3
Ectopic Pregnancy.....	2
Exploratory Laparotomy.....	1
Operative Findings	
Varicose Veins Alone or With Sclero-Cystic Ovaries	9
Same plus Fibrosis Uteri.....	8
Retroversion	5
Appreciable-sized Ovarian Cysts.....	3
Operative Treatment	
Multiple Ligation.....	14
Wedge of Broad Ligament Removed with Tube... ..	9
Uterine Suspension	1
Uterine Suspension with Ligation.....	1

In the accompanying table are given some of the data obtained from the study of twenty-five cases found to have varicose veins of the broad ligament at the time of operation, during the period 1931-1935. In none of these cases did we feel justified in making a primary preoperative diagnosis of varicose veins, because of other suggestive findings on examination, although in the later cases we have felt more bold in giving it consideration in patients with severe distress and paucity of findings.

As seen from the first grouping, the symptoms most commonly complained of are leukorrhea,

pain in the back and lower abdomen and sense of weight in the pelvis, with other symptoms occurring less often. None of these is, of course, pathognomonic of this condition.

Among pelvic findings, tenderness, with or without suggestion of a mass, is a characteristic finding. Usually there has been enough evidence of resistance to palpation to lead us to make a tentative diagnosis of chronic salpingitis or ovarian cyst. In two cases the history and findings led us to a diagnosis of tubal pregnancy. An exploratory laparotomy after a long period of distress with no findings on examination was resorted to in one case. Nine patients were operated upon primarily for an appendicitis, acute or recurrent, but there were also in the history and routine pelvic examinations evidence of pelvic pathology, explained by the presence of these varicose veins, and completely relieved by their treatment.

The operative findings are interesting, in fact it is because of some of them that we have drawn some of our conclusions. In nine cases in spite of severe pelvic pain and distress, nothing was found in the pelvis at time of operation except varicose veins, either alone or with these small ovaries studded with minute cysts, which are considered by some to be the result of long-standing varicose veins. In eight other cases nothing additional was found but indications of fibrosis of the uterus. It seems striking to us that severe pelvic pain was present in these seventeen patients with no other disease present. In three cases cysts one inch or more in diameter were found. Retroversion, associated with varicose veins, was found in five cases.

Operative treatment in the majority of cases consisted of multiple ligation of the varicose radicals with the idea of forming thrombi between the ligated points. This method of treatment has given complete relief of pain. In nine cases, due to associated tubal pathology or at the request of the patient, a wedge of the broad ligament was removed with the tube. In addition to ligation, the uterus was suspended in two cases. We have not resected the veins between the ligatures because the relief secured by simple ligation has so far in our series been permanent.

Conclusions

1. Varicose veins of the broad ligament without other disease being present are a definite cause of pelvic pain.
2. Correcting this condition completely relieves the pain and attending symptoms.
3. From an anatomical and pathological consideration it may be stated that when allowed to persist varicose veins lead to congestive changes in the ovaries and uterus.
4. Failure of other types of pelvic operations to completely relieve symptoms may be due to overlooking the presence of varicose veins of the broad ligament.

I am indebted to Dr. O. I. Sohlberg, Saint Paul, for permission to include his cases in this report.

Bibliography

1. Castano, C. A.: Varicocele pelvien; son diagnostic et son traitement. *Presse Med. (Argentina)*, 32:1027, 1924.
2. Castano, C. A.: Pelvic varicocele. *Surg., Gyn. and Obst.*, 40:237, 1925.
3. Crosthwait, W. L.: Varicocele of the broad ligament. *Tex. Med. News*, 24:296, 1915.
4. Darnall, W. E.: Pelvic varicocele. *Jour. Am. Med. Assn.*, 63:391, 1914.
5. Dudley, A. P.: Varicocele in the female: What is its influence on the ovary? *N. Y. Med. Jour.*, 48:147, 174, 1888.
6. Dwight, Thomas: Varicocele in the female. *Boston Med. and Surg. Jour.*, 96:185, 1877.
7. Emge, L. A.: Varicose veins of the female pelvis. *Surg., Gyn. and Obst.*, 32:133, 1921.
8. Emge, L. A.: The surgical treatment of varicose veins of the female pelvis. *Jour. Am. Med. Assn.*, 85:1690, 1925.
9. Fothergill, W. E.: Varicocele in the female. *Brit. Med. Jour.*, 2:925, 1921.
10. Hetherington, E. M.: Operation for retroversion of uterus and varicose veins of the broad ligament. *Jour. Missouri Med. Assn.*, 30:409, 1933.
11. Hirst, V. C.: Three cases of varicose veins of broad ligament. *Med. News*, 56:538, 1890.
12. Kelly, H. R.: *Bull. Johns Hopkins Hosp.*, 1:23, 1890.
13. Kelsall, O. H.: Varicose veins of broad ligament. *Am. Jour. Surg.*, 35:8, 1921.
14. Malins, E.: Case reports. *Am. Jour. Med. Sci.*, 98:340, 1889.
15. Miller, S. M., and Kanavel, A. B.: Uncomplicated varicose veins of the female pelvis. *Am. Jour. Obst.*, 51:480, 1905.
16. Nilsen, J. R.: Varicosity of the pampiniform plexus as a cause of ovarian pain. *Am. Jour. Obst.*, 22:156, 1889.
17. Pigford, T.: Pelvic varicocele. *Jour. Okla. Med. Assn.*, 22:31, 1929.
18. Pike, Harry: Pelvic varicocele. *Med. Jour. and Record*, 124:418, 1926.
19. Richet, Trait. d. Anatomie Medico-Chir., 1854, p. 753. Quoted by Miller and Kanavel.
20. Rowse, E. L.: Varicocele in the female. *Brit. Med. Jour.*, 2:1114, 1921.
21. Shober, J. B.: Varicocele of the broad ligament. *Am. Jour. Obst.*, 43:664, 1901.
22. Sihler, W. H.: Varicocele of the broad ligament. *Jour. Lancet*, 41:13, 1921.
23. Tracy, S. E.: A criticism of the usual surgical treatment of varicocele of the broad ligament. *New York Med. Jour.*, 90:324, 1909.
24. Wall, J. A.: Pelvic varicocele. *Surg., Gyn. and Obst.*, 23:62, 1916.
25. Wilson, W. R.: A case of varicose veins of the broad ligament. *Med. News*, 58:694, 1891.

CLINICAL PATHOLOGIC SEMINAR*

Conducted by E. T. BELL, M.D.

Department of Pathology, University of Minnesota
Minneapolis

Eclampsia

Case 9.—A woman, thirty-one years old, a primipara, was first observed by a physician early in her pregnancy, at which time the urine and blood pressure were normal. During the first three weeks of January she had edema of the ankles frequently. On January 22 she was seen by a physician, who found a slight edema of the lower extremities; albumin in the urine; blood pressure 120/80. She was put on a milk diet and advised to rest.

She was next seen on February 5, at which time the blood pressure was 152/92. There was slight edema of the legs and ankles and moderate albuminuria. She was having some headaches. She was admitted to the hospital on February 15 in a state of coma. Blood pressure was 184/90; slight edema of the lower extremities. Urine was loaded with granular and hyaline casts; albumin ++++; specific gravity 1.034. Very little urine was being excreted; 4 ounces removed by catheter.

Blood chemistry on the day of admission showed: creatinin 1.5 mg; urea nitrogen 27 mg.; blood sugar .15 per cent; van Slyke 46. Temperature on admission was 99°; this gradually rose, attaining a maximum of 103° on the day of death.

Pregnancy was estimated to be of about five and one-half months' duration. A spontaneous abortion occurred shortly after admission. The patient did not recover from her coma. Death occurred February 18.

Positive postmortem findings: Bronchopneumonia of hypostatic type. The liver weighed 1,900 grams; there was extensive subcapsular hemorrhages over the greater part of the anterior surface. On section there was a cloudy parenchyma with numerous small red areas. The kidneys together weighed 300 grams and on section they were extremely pale and cloudy.

Microscopic examination: The liver showed extensive small areas of hemorrhagic necrosis (this is typical of eclampsia). The kidneys showed the characteristic thickening of the basement membrane of the glomerular capillaries.

Comment: The clinical picture established the diagnosis of eclampsia even though there were no convulsions; occasionally death occurs in eclampsia even though no convulsions have occurred. This is sometimes called eclampsia without convulsions; it is also often called pre-eclampsia. Albuminuria, edema and hypertension are sufficient to establish the diagnosis clinically. This is true eclampsia and not the nephritic toxemia of pregnancy, since the kidneys showed no lesion except the glomerular changes and the tubular swelling characteristic of eclampsia. It is also clear that this is not a nephritic toxemia because the blood pressure and the urine were normal early in the pregnancy. The diagnosis of eclampsia may be established at postmortem by the structural changes in the kidneys even in the absence of the typical hemorrhages in the liver.

Tetanus

Case 10.—A negro, thirty-three years old, was admitted to hospital September 2 complaining of pain in the chest and abdomen. He said that three days previously he had had a crampy sensation in the upper

abdomen and lower thorax. The condition became progressively worse until at the time of admission he was suffering from cramps in the upper abdomen and lower thorax every hour.

Temperature was 99.6°; pulse 72; respirations 24; blood pressure 115/70. Examination of the chest yielded no special findings. There was generalized rigidity of the abdomen without tenderness and without rebound tenderness. There was positive psoas contraction. No masses were palpable. The extremities were normal except for an old injury to the middle finger of the right hand; this crushing injury had occurred two weeks previously and again one week previously. It had resulted in loss of the nail, which had been removed at the dispensary. The patient had vomited once but there was no blood in the vomitus. There were no intestinal noises. A flat plate of the abdomen showed nothing of importance. The leukocyte count was 8,000. The urine was normal.

On the day after admission the surgical staff suggested that the abdominal rigidity was probably of central origin. An emergency Kahn test gave negative findings.

Late in the evening of the second day the patient had a spasm of the spinal muscles with retraction of the head; he was found to be lying on his side in marked opisthotonos. Reflexes were questionable but probably normal. Spinal fluid was under pressure; it was cloudy and contained four cells.

The following morning the patient responded only vaguely when spoken to and still had spasm of the muscles and rigidity on stimulation, such as taking the pulse. The finger had been incised freely and wet Dakin's packs had been applied. From time to time there were attacks of sudden stiffening of the body. Perspiration was very profuse. Respirations became labored and rapid and death occurred in the evening of the second day of residence, September 4, at 8:40 p. m.

The only positive postmortem findings were as follows: The nail on the middle finger of the right hand was absent and the area was covered with a crusted exudate; there were some recent surgical incisions in the finger; there was only moderate swelling. There was no regional adenopathy. There was some cloudy swelling of the liver and kidneys and purulent bronchitis. Tetanus bacilli were cultivated from the lesion on the middle finger.

Comment: This is a typical case of tetanus with onset about two weeks after the injury. It is to be noted that this was a crushing injury of the finger. The diagnosis was made clinically and was confirmed at postmortem examination by demonstration of tetanus bacilli in the wound and by the absence of major lesions in the various organs.

Primary Carcinoma of the Liver

Case 11.—The patient, a man seventy-two years old, was first seen October 8 complaining of pain in the upper right quadrant and increasing difficulty in obtaining bowel movements, two complaints which had been present about three weeks. Before this time his bowel movements had been normal. There had been progressive loss of weight, especially the last six months; he had lost 40 pounds during the last year. For six months there had been progressive weakness and fatigue.

CLINICAL PATHOLOGIC SEMINAR

At the hospital complete physical and gastro-intestinal examination was made. Conjunctiva and skin showed a slightly icteric tinge; skin was loose and muscles soft and flabby. Blood pressure was normal. Heart and circulatory function were satisfactory. Electrocardiogram was normal. The lungs were normal. Abdominal examination showed nothing unusual throughout; spleen and liver edges were not palpable. The Graham-Cole test showed a nonfunctioning gall bladder. Gastro-intestinal study, including a barium enema, resulted in no important findings except that the duodenal loop was rather wide. Urine and blood showed nothing abnormal. The Kahn reaction was negative. Liver function: bromosulphalein 100 per cent retention at the end of five minutes, 30 per cent at the end of thirty minutes. A direct van den Bergh test gave negative findings; indirect quantitative 1.2 units. In view of the fact that the patient was on the threshold of clinical jaundice the retention of dye on the part of the liver was not given serious consideration.

He returned to his home. At the end of three weeks the bowels were moving satisfactorily; he was free from pain; felt generally improved; quantitative van den Bergh reaction was almost normal (.5 unit). Later he had rather sharp pain in the right upper quadrant in an attack suggestive of acute cholecystitis, rather mild in degree. About a week later while in the bathroom he had a collapse, apparently from weakness. From this time on he sometimes felt quite well but did not attain the same level of well-being that he had in the first three weeks after he left the hospital. In spite of good fluid intake he always had a dry tongue and dry mouth; he had very poor appetite, physical weakness and loss of weight.

Seven days before death liver function test showed: bromsulphalein 80 per cent retention in five minutes, 15 per cent in thirty minutes; quantitative van den Bergh 1.4 reaction direct negative. December 18 blood sugar was 108 mg.; nonprotein nitrogen 39 mg.; blood chlorides .453. On December 21 he was definitely jaundiced with abdominal distention and ascites. The distention increased daily. The upper portion of the abdomen felt hard and unyielding; this condition persisted. He died December 25, at 8 p. m.

At postmortem examination the peritoneal cavity contained about 1500 c.c. of bloody fluid with numerous clots of blood. The bleeding evidently came from a projecting mass of tumor on the surface of the liver. The heart weighed 400 grams and showed no disease. The spleen weighed 200 grams and showed chronic passive congestion. The liver weighed 2800 grams. On the right part of the inferior surface was a projecting mass of tumor about 6 cm. in diameter, from which bleeding had occurred. On section all of the entire right lobe and portions of the left lobe were replaced by tumor. There was only a thin layer of liver tissue covering the tumor in the right lobe. The weight of the liver after removing the most of the tumor was 1200 grams. The central portions of the tumor were hemorrhagic and necrotic. There was a tumor thrombus partly occluding the portal vein. The hepatic veins were free from tumor. The portions of the liver not involved by tumor were compressed and bile-stained. The gall bladder showed no disease. There were no lesions of the gastro-intestinal tract. There were no metastases of the tumor.

Microscopic sections showed typical hepatoma composed of cords of cells closely resembling liver.

Diagnoses: Primary carcinoma of the liver (liver cell hepatoma). Intrahepatic hemorrhage from a necrotic tumor nodule.

Comment.—It is not clear why the enlarged liver was not recognized on physical examination but the abdominal wall was very thick. Liver function test suggested extensive destruction of liver tissue but it was not clear

clinically what the nature of the hepatic lesion was. The clinical diagnosis of primary carcinoma of the liver may be established with reasonable certainty by the enlargement of the liver in the absence of any evidence of a primary tumor elsewhere. Thorotrast injections sometimes lead to the correct diagnosis of primary tumor because the hepatoma, unlike metastatic tumors, takes up the thorotrast.

Syphilitic Aortitis

Case 12.—A man, forty-three years old, was admitted to hospital January 9 because of extreme orthopnea, dyspnea, palpitation, tachycardia and swelling of the ankles. He was married; his wife is living and well and has a negative Wassermann reaction; four children are living and well.

In 1911 at the age of nineteen he contracted gonorrhea; there was no history of primary syphilitic infection. In 1915 he had an attack of palpitation, dyspnea and orthopnea. He recovered from this and was free from symptoms for several years. In 1932 he was under observation for what was diagnosed as goiter and was advised to have thyroidectomy. He consulted another physician, who discovered enlargement of the heart with an aortic lesion and signs of regurgitation; his Wassermann reaction was positive.

Some time in 1933 he began to have attacks of dyspnea, orthopnea and edema of the ankles. These attacks were relieved to some extent by treatment. He was never willing to remain in bed and was up and about even during the attacks. During the eighteen months previous to admission he had been given seven arm and hip injections, presumably for syphilis.

Physical examination on admission showed a well developed, fairly well nourished white man with extreme dyspnea and orthopnea. The pupils reacted to light and accommodation. Ears and throat were normal; lungs also. The heart was enlarged to the left and right; the apex beat was visible with a palpable thrill; to and fro murmurs were heard over the mitral area and a systolic murmur over the aortic. There was slight pitting edema of the feet. There were no positive findings in the abdomen. Knee jerks were sluggish and the Babinski reaction was negative. Blood pressure in the right arm was 140/50, in the left arm 190/36. Urine: specific gravity 1.019; albumin +; a few casts. Blood: hemoglobin 70 per cent; erythrocytes 4,630,000; leukocytes 4,600 with 58 per cent polymorphonuclears, thirty-seven per cent lymphocytes; Wassermann +++++; Kahn +++++.

Death occurred suddenly on January 15, six days after admission.

At autopsy the heart weighed 1020 grams; there was marked hypertrophy of the left ventricle; the mitral, tricuspid and pulmonary valves were normal; the aortic valve showed diffuse irregular leathery thickening throughout. There was similar diffuse whitish leathery thickening of the root of the aorta without calcification or atheroma. The coronary orifices were patent and the coronary arteries showed no disease. There was slight dilation of the ascending aorta. There was no pneumonia. The spleen weighed 220 grams and showed chronic passive congestion. The liver weighed 1950 grams and showed chronic passive congestion. There was no disease of any other organs.

Diagnoses: 1. Syphilitic aortitis with involvement of the aortic valve producing aortic insufficiency.

2. Marked hypertrophy and dilation of the heart with cardiac failure and general venous congestion.

Comment: The syphilis was probably contracted in 1911 or thereabouts. The cardiac attack which the patient had four years later was probably due to syphilitic aortitis. Evidently the syphilitic aortitis had per-

(Continued on page 398)

EDITORIAL

MINNESOTA MEDICINE

OFFICIAL JOURNAL OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Published by the Association under the direction of its Editing and Publishing Committee

EDITING AND PUBLISHING COMMITTEE

J. T. CHRISTISON, Saint Paul C. B. WRIGHT, Minneapolis
E. M. HAMMES, Saint Paul T. A. PEPPARD, Minneapolis
WALTMAN WALTERS, Rochester

EDITORIAL STAFF

CARL B. DRAKE, Saint Paul, Editor
W. F. BRAASCH, Rochester, Assistant Editor
C. A. MCKINLAY, Minneapolis, Assistant Editor

Annual Subscription—\$3.00. Single Copies—\$0.40
Foreign Subscriptions—\$3.50.

The right is reserved to reject material submitted for editorial or advertising columns. The Editing and Publishing Committee does not hold itself responsible for views expressed either in editorials or other articles when signed by the author.

Classified advertising—five cents a word; minimum charge, \$1.00. Remittance should accompany order.

Display advertising rates on request.

Address all communications to Minnesota Medicine, 2642 University Avenue, Saint Paul, or 411 National Bldg., Minneapolis. Telephone: Nestor 2641.

BUSINESS MANAGER

J. R. BRUCE, Saint Paul

Volume 19 JUNE, 1936 Number 6

The A. M. A. Meeting

THE seventy-ninth annual meeting of the American Medical Association was in every way gratifying, and from the point of attendance eminently successful, the registration numbering over 6,500. The new auditorium at Kansas City is entirely adequate for the housing of large conventions. The scientific exhibits were outstanding in variety and received well-deserved attention, while the commercial display, large and wonderfully well arranged, attracted crowds at all times. Meeting halls for the various section meetings were all that could be desired.

There were a total of one hundred and sixty-three delegates in attendance, representing the several states and territories, the sections, the Army, Navy, and the United States Public Health groups of the Federal service. The meetings of the House were conducted in the orderly and dignified way characteristic of the deliberations of that body. It was pleasing to note that

the traditional relation between doctor and patient was strongly upheld.

The serious illness of the president-elect, Dr. J. Tate Mason, of Seattle, had a noticeably depressing effect on the members of the House. Dr. Mason was by unanimous vote installed as president in absentia on Wednesday evening. Dr. John H. J. Upham, Dean and Professor of Medicine at Ohio State University, Columbus, Ohio, was named president-elect, and Dr. Charles Gordon Heyd, Professor of Clinical Surgery at Columbia, New York, as vice president, all the other officers being re-elected.

The House went on record as disapproving of x-ray diagnosis and treatment by lay organizations, and requested the appointment of a committee by the board of trustees to study the subject of Air Conditioning in association with competent engineers. Legislation of value to the organized profession of medicine received a good share of attention.

Atlantic City won out over Philadelphia by a vote of 70 to 69 as the place of meeting for 1937.

J. T. C.

The State Meeting

OUR annual meeting at Rochester last month was attended by a good percentage of the membership, some 1,470 Minnesota physicians having registered. The 195 from other states included forty-nine from Wisconsin, forty-three from Iowa, twenty-six from North Dakota, fifteen from Illinois, some twenty-nine states having been represented. In addition there were thirty-five physicians from Canada and foreign countries. Some 150 of those attending the gathering of the American Association of Thoracic Surgeons which met at the same time in Rochester, also registered at our meeting. Including 187 nurses, 544 Women's Auxiliary members and 107 exhibitors, the total registration numbered 2,688.

Dr. Olin West, our national secretary, was prevented by illness from making his scheduled address Monday evening. His place was ably taken by Dr. H. H. Shoulders of Nashville, who gave

an able presentation of economic phases of medical practice.

At the Monday evening meeting Dr. W. J. Mayo introduced Sir Henry Wellcome to the audience. Sir Henry Wellcome lived as a boy in Garden City, Minnesota, and at the age of sixteen obtained a position with the Boole and Geisinger Drug Store in Rochester, Minnesota. At the age of nineteen, on the advice of Dr. W. W. Mayo, father of Drs. W. J. Mayo and Charles Mayo, Henry Wellcome went to Philadelphia to study chemistry and graduated from the University of Pennsylvania. After some practical experience he went to England and founded the pharmaceutical house of Burroughs Wellcome and Company. In 1913 he founded in London the Wellcome Historical Medical Museum and later the Wellcome Research Institute, which is known throughout the world. For his outstanding work and contributions to science he was knighted by the King of England.

The "G Men" exhibit and address by one of Uncle Sam's staff proved interesting. It was a surprise to many that the criminal detective activities of this branch of the public service comprise such a small percentage of the 80,000 cases yearly investigated.

The House of Delegates chose an outstanding member of the profession as president for 1937—Dr. A. W. Adson of Rochester. Other officers elected include Dr. H. W. Goehrs, Saint Cloud, first vice president; Dr. D. P. Head of Minneapolis, second vice president; Dr. E. A. Meyerding, Saint Paul, secretary, and Dr. W. H. Condit, Minneapolis, treasurer. A. M. A. delegates elected were Dr. W. F. Braasch, Rochester, and Dr. W. A. Coventry, Duluth, with Dr. W. L. Burnap, Fergus Falls, and Dr. George Earl, Saint Paul, as alternates.

Dr. J. S. Holbrook, Mankato, Dr. J. M. Hayes, Minneapolis, and Dr. W. L. Burnap, Fergus Falls, were re-elected councillors for the fourth, sixth and eighth districts respectively.

Dr. R. G. Green received the medal presented yearly by the Southern Minnesota Medical Association for the best scientific exhibit. Dr. Green's display was on tularemia and certain filterable viruses.

The next annual meeting will be held in Saint Paul in the spring of 1937, the exact date to be determined by the Council.

Prevention of Tularemia

THE investigations which have been made by Dr. Robert G. Green of the University on the subject of the distribution of tularemia in animals and birds should be of practical interest to physicians.

Dr. Green has been devoting much of his time during the past ten years to personally investigating the incidence and transmission of tularemia. His address before the Minnesota Academy of Medicine last month elicited much interest, and discussion brought out a number of valuable points to be observed in the prevention of human infection.

Dr. Green has found that tularemia is widespread in small animals and birds in the territory investigated, which extends from Hudson Bay south to the Gulf. He has reason to believe this infection is present throughout North America from northern Canada to central Mexico. It has not been found in South America but has been reported in the Scandinavian countries, Germany, Russia and Japan. It probably is not a new disease although it was first discovered in 1912 by McCoy in the ground squirrels of Tulare County, California, hence its name. It was known that rabbits were dangerous as an article of food when Moses declared them unclean. (Leviticus XI:6, 8.)

A rather strange finding has been the frequent presence of tularemia in rabbits in May and June and in September and October, but not in July and August. This leads to the assumption that hot weather has something to do with the limitation of the infection in the animal kingdom.

The greatest danger of human transmission is from infection of an abrasion by handling a diseased animal or bird, the cottontail rabbit being most frequently infected of all small animals. The rabbit and grouse ticks with which these animals are heavily infested disseminate the disease among animals while the ordinary wood tick and deer fly may transmit it to human beings. Deer fly fever has been proven to be tularemia.

What precautions, then, are advisable for the individual who roams the woods in Minnesota? First, care in the handling of small game and game birds, considering all infected until proven otherwise. Wood ticks are particularly prevalent in May and June, in Minnesota, but disappear about the Fourth of July. After a walk in the woods during these two months one should

strip and make a thorough search for wood ticks. If a tick is found attached, a good disinfectant should be used before it is removed. Castor oil soap has been found particularly effective. The reason for this procedure is that the infection of tularemia is not transmitted by the bite of the wood tick but by the contamination of the wound from the feces of the tick. The tick does not defecate until it has started to engorge, so there is more danger of human infection from an overlooked tick than from one simply attached.

From the known facts it may be concluded that hunting is comparatively safe in late October but rather dangerous in September.

While tularemia presents a difficult problem for the epizootologist and the transmission to human beings merits consideration (some sixty cases having been reported in 1935 and forty in 1934), the fact remains that of the thousands of individuals bitten each year by wood ticks relatively few are infected. It is further reassuring that the mortality is only 2 or 3 per cent. There is no reason, however, why members of the profession should not inform the public how to avoid possible infection.

Variations in Liver Extracts

THE discovery of the value of liver in the treatment of pernicious anemia first was made available to the profession in 1926. Eating the necessary amount of liver daily (preferably raw) was anything but agreeable for the patient and became expensive as the price of liver rose. Soon liver extracts to be taken orally were prepared, but this was even more expensive treatment.

The production of liver extract to be given intramuscularly has been a further triumph and its use has almost entirely replaced other methods of administration of liver or its extracts.

Unfortunately, however, liver extracts have not been standardized according to units of efficacy. Numerous pharmaceutical houses offer extracts of which one, two, three or more cubic centimeters represent extractions from 100 grams of liver, and the physician is ignorant as to methods of extraction and whether the extracts produced by the various concerns are comparable according to grams of liver extracted. One brand is equivalent to so many grams of

liver by mouth and another which is less expensive than the rest is accompanied by no statement as to how much liver is extracted to produce one cubic centimeter of extract. One of the fundamental considerations in therapy is to know what dosage is prescribed. The physician is at present decidedly at a loss to know which of the various priced liver extracts to choose and with the present status of affairs is forced to choose one at random and check his dosage by frequent blood counts.

On the other hand, patients with pernicious anemia vary markedly in their response to the parenteral administration of liver extract. For this reason no standardized dose of any one preparation can be given for all patients.

In our February issue an approximate idea of usual dosage of liver extracts was given in an excellent article by Murphy. His usual procedure has been to give within twelve or twenty-four hours the extract from 400 grams of liver intramuscularly and at the end of a month the extract from 100 grams weekly until the blood count reaches 5,000,000 and then the same dose at two, three or four week intervals as needed to maintain this count. The same author has tested an extract one cubic centimeter of which contains the extract from 100 grams of liver and has recently reported* that the efficacy of this preparation corresponds closely to the weaker extract of three cubic centimeters derived from the same amount of liver.

For a physician who is unable to check the efficacy of his treatment with frequent blood counts, it is desirable to give somewhat more than the average dosage mentioned above. Blood counts at certain intervals enable one to regulate amount and frequency of injections with much greater accuracy.

The modern treatment of pernicious anemia is highly efficacious, although it must be continued indefinitely.

The parenteral use of liver extracts, even though the most expensive are used and even though the treatment must be continued indefinitely, is much less expensive for the patient if properly used than the oral administration of liver or liver extract. The physician, however, should realize the difference in potency of the various liver extracts available.

*Murphy, W. P.: Treatment of pernicious anemia with intramuscular injections of a highly concentrated solution of liver extract. *Am. Jour. Med. Sci.*, 191:597, (May) 1936.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
L. H. Rutledge, M. D.

W. F. Braesch, M. D., Chairman

J. C. Michael, M. D.
A. N. Collins, M. D.

What Can I Do for My County and State Medical Society?

Suggestion Number Six

Do you know the Senator from your own legislative district?

Do you know the Representatives from your district?

If not, make it a point to know both.

1. Find out how they feel about Organized Medicine.

2. Find out what their views are on quack medicine, too—on state medicine. And on all of the economic and social problems that confront the medical profession today.

Friendly, informal conferences on these matters between legislators and the doctors in their own districts provide an excellent source of accurate information for legislators.

Information thus secured on the policies of the legislators will be of value, also, to the Committee on Public Policy and Legislation of the State Association.

Delegates and Councilors Meet

A lively interest in medical organization and in the relation of physicians to the social and economic problems of the times was evident at the Rochester meeting of the Minnesota State Medical Association.

Delegates and Council members and officers willingly gave an extra day exclusively to attendance on Council and House of Delegates' meetings Sunday, May 3. Thirty-eight delegates attended the sessions and the hall was filled at all times with members, delegates and non-delegates alike.

New Constitution

Results: Provisional adoption of a revised constitution for the state association. This new constitution eliminates anachronisms and con-

traditions. It provides modern machinery for the conduct of the ever more complicated and far-reaching business of medical organization and reorganizes and revises the old, top-heavy and overlapping structure of committees.

This was perhaps the most laborious and time-consuming task before either of the governing bodies of the organization at this session.

For New Legislation

Adoption, also, of concrete recommendations for the information and guidance of the Interim Commission of the Legislature and others who are engaged on the task of formulation of new relief legislation to be presented at the next Legislature.

These recommendations and some appended resolutions with regard to the future of the State Board of Health and with regard, also, to the legal provision for medical care for old age pensioners, will supply medical men in the individual counties with a concrete guide and measure to help them in their individual arrangements with county officials for medical care of the sick poor.

Better Understanding

Salutary discussion of several other issues, vital to organizations and individuals, resulted in no official action but contributed notably to the better understanding of the obligations and rights of medical men in their public and private relations to other men.

Among these debated issues were: the question of shortage of nurses; of the rights of patients and physicians under the Industrial Compensation Act; of the part that physicians are likely to play and the responsibilities that physicians must assume in the several sections of the Social Security Legislation involving health and medical care.

President's Message

The 83rd Annual Meeting of the Minnesota State Medical Association is over now and there has been the usual pleasant aftermath.

Visiting speakers have sent their compliments on the distinction of the program and organization of sessions and exhibits.

Technical exhibitors who measure meetings by an exact standard have again rated the annual Minnesota gathering at the top among state and section conventions of medical men.

It is borne in upon us again that one of the most important functions of a state medical association is its annual meeting; that no special, sectional session can take the place of the larger gathering where the leaders in all branches of medicine and surgery gather for discussion and exchange of knowledge.

A fine state meeting of high scientific standards and sufficient stellar attractions to draw men of all interests and specialties is one of our best guarantees against the evils of over-specialization in medicine.

It is also our best means of reaching all of our members directly and forcibly with the social and economic relations and problems of the medical profession and also its ever-enlarging relations with outside agencies and affairs.

Medicine in Minnesota is now embarked upon a new phase of these relations, that of active cooperation with these outside agencies in regulation of many phases of relief and welfare work that touch upon medical care. Important policies which are to guide medical representatives in their handling of these affairs were established by the House of Delegates at the 83rd meeting. They signify, among other things, a new sense of responsibility for the social welfare among physicians.

W. W. WILL, M.D., President,
Minnesota State Medical Assn.

Health and Security Plans

The Council of the Minnesota State Medical Association is the advisory body to the State Board of Health in the new program made possible under Title Six of the Act for the extension of Public Health.

Dr. A. J. Chesley, State Health Officer, appeared before the Council to outline the plans of the Board for expenditure of the approximate \$93,000 to be made available under the Act to his Board under supervision of the United States Public Health Service. The plans outlined by Dr. Chesley were substantially the same as those sketched in preliminary form at previous meet-

ings of the Council and reviewed in these columns.

The disposition of the Board and of Dr. Chesley has been consistently to work with organized medicine to extend necessary health measures to all the people of the state and not to infringe in any way upon the private practice of medicine.

Immunization

Bearing out this intention, the Board, at a subsequent meeting, definitely voted to leave all immunization and vaccination which may be promoted through the new Social Security organization definitely in the hands of the family physician.

The so-called "Minneapolis plan" was approved for the state by the Board as one method by which this policy may be carried out. This plan provided that the Division of Health should send all who applied for immunization or vaccination to the doctors of their choice among members of the Hennepin County Medical Society. Those who could not pay for the service themselves were paid for by the Board of Welfare through the Division of Health at a stipulated fee. Other methods for payment might be worked out in other communities according to conditions in each locality.

Passed by the House

Following are the recommendations for new relief legislation that were approved by the Council and passed by the House of Delegates, also the two resolutions bearing upon the State Board of Health and the medical care for the aged.

Three Recommendations

The following considerations are regarded as fundamental to good medical care in Minnesota and are recommended by the House of Delegates of the Minnesota State Medical Association in session at Rochester, on May 3, for inclusion in the new relief and welfare legislation that is now being drawn up for enactment by the state legislature.

"1. That the proposed County Welfare Plan provide for medical care for the indigent poor; that the patient be allowed free choice of physician and that payment for this care be declared explicitly to be the responsibility of the county in which the patient resides.

"2. That the so-called 'county plan' for care of the indigent is preferable to the township plan and that

legislation should be enacted at the next session of the legislature requiring all counties to operate on a 'County Board of Welfare' plan.

"3. That legislation be enacted to permit state funds to be used to supplement county funds for care of the indigent."

Medical Care for the Aged

"WHEREAS, the following provision appears in the Minnesota law regarding old age pensions (c, under Section 5):

"While a recipient is receiving old age assistance, he shall not receive any other relief from the state or from any political subdivision thereof except for medical, dental, surgical or hospital assistance or nursing care"; and

"WHEREAS, the responsibility for providing this assistance and care rests with each individual county; and

"WHEREAS, county commissioners and welfare boards in a few instances have declined to provide this assistance and care to old age pensioners, most of whom are in frequent need of such care and who cannot pay for it out of their meager pensions; be it, therefore,

"RESOLVED, That the House of Delegates of the Minnesota State Medical Association go on record urging county commissioners and welfare boards to assume this responsibility and make special provision to care for needy old people."

For an Independent Board of Health

"WHEREAS, the Minnesota State Board of Health has a national reputation for progressiveness and efficiency; and

"WHEREAS, the function of a department of health is exclusively involved with the prevention of disease; and

"WHEREAS, this function operates most effectively when it is separate and independent from relief and care of the poor; be it

"RESOLVED, That this House of Delegates here record its recommendation that the State Board of Health be continued as an independent department of our state government coöperating with other welfare agencies; and be it also

"RESOLVED, That the State Department of Health be commended for its fine program and its close coöperation with the medical profession in Minnesota."

Thanks

Two other important resolutions passed the two bodies expressing appreciation on the part of physicians for the work of two New Deal administrators: Mr. L. P. Zimmerman, State Administrator for Relief, and Mr. Victor A. Christgau, State WPA Administrator.

The readiness of these two officials to hear the doctor's point of view on the relief and work relief problems in general and to coöperate in the application of the principles of good medi-

cal practice in all medical phases of their respective programs has earned the gratitude and respect of organized medicine. So has the willingness of Mr. Zimmerman and his staff, especially, to assist in perpetuating these principles in the new county organizations for relief.

Survey by the Secretary of a Year's Activities

Two or three reports of officers and committees submitted at this session stand out especially and deserve special mention here. (All the proceedings, including reports, will be published, in brief, in an early issue and should be studied.)

One of these is the report of Secretary E. A. Meyerding, which provided a review and evaluation of the work of the association for the year, touching upon the activities of many committees.

According to this review, physicians of Minnesota are actively engaged in a significant variety of undertakings. Their most immediate concern is involved, of course, in the solution of the problem of medical care for the sick poor. This problem, thanks to friendly and satisfactory relations with the state agencies concerned, is in a better position for ultimate satisfactory solution than ever before.

Policies Adopted Towards Social Security

By virtue of the Council's appointment as advisory committee to the State Board of Health in its new program, the state association is intimately concerned, also, in the progress of Social Security in Minnesota.

This concern takes the form, now, of the formulation of policies, chiefly. It must merge into an active and alert participation as the program itself takes shape in Minnesota. Otherwise, as in the solution of the relief problem, the chance to establish a fundamentally sound working basis for all these new social experiments will be gone forever.

The association has taken the lead during the year, also, in the important consultations with representatives of other professions, the pharmacists, dentists and nurses. The problem presented by changing standards for nurses' education is of vital interest to physicians. It comes within the purview of the state association and its Inter-professional Committee and is discussed elsewhere in these columns.

Debates, News Service, Et Cetera

The state association lent its assistance to debates and debate coaches in the year's debates on the subject of State Medicine. (See the final results of the regional debates which appear also in this issue.)

It carried on a medical lecture course for college students with the assistance of the Minnesota Public Health Association; a news service reaching all the rural newspapers of the state; a weekly radio program now in its eighth year and conducted from the start by Dr. William A. O'Brien of the University of Minnesota. It arranged for hundreds of talks by physicians before lay audiences and for a good many other talks by physicians before their own medical societies. It arranged for numerous conferences on social and economic matters, including the annual County Officers' Meeting.

Having recited details of these and a considerable number of other activities which should certainly be studied carefully by every member, the report came to a close with the following heartening conclusion:

"We Shall Not Fail"

"Clearly, at this state in our relations with all of the official agencies, it depends upon us and the wisdom and strength of our own organization whether we shall be able to maintain our independence and integrity as a profession in Minnesota.

"More than ever we need close organization, a closer contact between the affiliated county and district societies and the state office and between the county and district societies and their councilors. Members of the Council meet frequently, are in touch with new developments. In addition they are men of long experience in medical organization and familiar with the policies of Organized Medicine. They should have an intimate knowledge of the problems and undertakings of each society under their jurisdiction so that all may be brought into harmony with state-wide policies and plans.

"We have before us a critical year. Times and institutions are changing. Some of these changes are bad and we are bound to fight them. If our policies are worthy of our great tradition, however, and if we present a united front in maintaining them, we shall not fail."

Public Health Relations

Said the Committee on Public Health Education, Dr. L. R. Critchfield, chairman:

The problem of the Committee on Public

Health Education has become two-fold in the last few years.

It must extend public knowledge of medical procedures and increase public confidence in the medical profession. It must also make sure that the medical profession, for its part, is universally ready to participate in all the accepted modern protective procedures as well as in curative medicine.

The public educational services of the association carried on through this committee are well known. The committee is branching out more each year in its campaign to urge upon physicians the necessity for continuous postgraduate instruction in the techniques of immunization and protection against disease.

To quote from the report:

"The passage of the Social Security Act has brought to a new focus the question of immunization.

"Funds will be available to extend all phases of preventive medicine far beyond their present limits.

Who Shall Immunize?

"Who is to do this work? Will it be a recognized function of the family physician or will everybody agree to leave it to hired physicians? In that case who is to say where preventive medicine would end and where curative medicine, which is all that would belong to the family physician by right, would begin?

"The problem is not simple. Organized medicine and your Committee are convinced that only harm can come to the practice of medicine, to the public and to the physician if the preventive procedures—immunization against diphtheria, vaccination against smallpox, skin testing for tuberculosis—are allowed to slip from the hands of the private physician to those of public health and school officials."

Policies Favored

Members of the committee met to talk over policies at Rochester and went on record to the following effect:

That only such protective procedures as are standardized and proved beyond any doubt to be effective and safe for routine use should be recommended as required public health protections. Other immunization procedures which require the individual supervision of the doctor for safety or which are still in the experimental stage should be administered only on the responsibility of the individual physician in his private practice. By this action the committee decided to confine its recommendations at present to immunization against diphtheria and vaccination against smallpox for routine public health meas-

ures, and to the Schick and tuberculin skin tests for diagnostic tests.

Laxatives

That the action of the Olmsted-Houston-Fillmore-Dodge Medical Society, recommending use of stickers on all packages of laxatives sold, be commended and adopted by the committee. These stickers warn of the danger of taking laxatives in the presence of abdominal pain.

That the attention of broadcasting companies be called to the danger attendant upon uncontrolled use of laxatives and that letters of commendation be sent to the broadcasting companies that have already discontinued such programs. This recommendation by the committee was officially adopted by the House of Delegates at a subsequent meeting.

Contract Practice

The Committee to Study Contract Practice suggested that the important simplification of medical ethics relating to contract practice as revised by the Judicial Council of the American Medical Association in 1934 be especially endorsed and reaffirmed by the House of Delegates. The endorsement was given and the section is quoted here because of the definiteness and completeness with which this troubled question is treated.

Each county society was urged by the Delegates to use this code as a measure for all forms of contract practice within its locality.

Code

"By the term 'contract practice' as applied to medicine is meant the carrying out of an agreement between a physician or a group of physicians, as principals or agents, and a corporation, organization or individual, to furnish partial or full medical services to a group or class of individuals for a definite sum or a fixed rate per capita.

"Contract practice per se is not unethical. However, certain features or conditions if present make a contract unethical, among which are: 1. When there is a solicitation of patients, directly or indirectly. 2. When there is underbidding to secure the contract. 3. When the compensation is inadequate to assure good medical service. 4. When there is interference with reasonable competition in a community. 5. When free choice of physician is prevented. 6. When the conditions of employment make it impossible to render adequate service to the patients. 7. When the contract because of any of its provisions or practical results is contrary to sound public policy.

"Each contract should be considered on its own merits and in the light of surrounding conditions. Judgment should not be obscured by immediate, temporary or local results. The decision as to its ethical or unethical nature must be based on the ultimate effect for good or ill on the people as a whole."

Inter-Professional Relations

It has become increasingly apparent in the last few years that none of the professions concerned in the delivery of medical, hospital, dental and nursing care to the people can function in isolation and without consideration for the rest.

The ultimate objective of doctors, dentists, pharmacists and nurses is the delivery of good medical and health service to the public.

If one of these groups jostles the others the result is costly not only to the professional personnel directly involved but to the people they serve.

It is with that in mind, and also with the obvious thought that advancement of medical care can best be served by the coöperative effort of everybody involved, that physicians have sought to coördinate all of these professional groups. This coördination has taken the form of friendly conferences and mutual discussion of problems and differences under the auspices of the Inter-Professional Relationships Committee.

For Better Prescription Writing

This committee reported several fruitful conferences to the House of Delegates, made recommendations with regard to medical relationships with pharmacists and nurses which should bring results.

It recommended, for the pharmacists:

1. That the State Medical Association continue its conferences and coöperation with the pharmacists and that county medical societies likewise give the pharmacists opportunities for discussion of local problems.
2. That the Editing and Publishing Committee be asked to provide reasonable space for presentation of problems of the pharmacists to the doctors in MINNESOTA MEDICINE.
3. That the attention of the Dean of Medical Sciences at the University of Minnesota be called to the fact that teaching of therapeutics and prescription writing is inadequate, in the opinion of the committee, and that he be urged to make it adequate and worthy the reputation and standing of the University Medical School.

Nursing Shortage

Recommendations with regard to the nurses were less explicit. They point out, however, that a serious shortage of nurses actually exists in Minnesota at the present time and that it is to the interest of doctors, nurses and the public to study the situation carefully.

The following criticisms of the nursing situation today were brought by the committee to the attention of the delegates as requiring discussion and study. They may not be just or true but they are frequently heard and the committee believes that they require the joint attention of nurses and physicians. They are:

Problems for Discussion

1. That arbitrary rulings are made by nursing organizations and the Nursing Board on nursing hours and costs (without consulting either hospitals or doctors); on the number of nurses who may be educated in a given hospital and on the number of patients the hospital must have for educational purposes; on the physical equipment and sanitary standards for hospitals approved for registration.

2. That an attempt is being made to raise standards of education for nurses above the need for bedside nursing which, at the same time, will mean a scarcity of nursing and bring hardships on the public.

3. That attempts are being made to pass laws that will put the control of nursing education largely in the hands of lay people, that is, of people with no nursing or medical education, possibly through government subsidies to individual hospitals that are not state institutions.

The committee suggested that a thorough study be made of the law under which the Board of Nursing Examiners is operating to determine its present limitations and to suggest such modifications through the coöperative effort of hospitals, doctors and nurses as will cover present-day requirements.

Nurses and physicians who talked the matter over at the conference agreed that nurses who contemplate teaching or administrative work or specialization should by all means have extensive training. That ordinary bedside nursing does not require college degrees seemed to be agreed and also that the raising of requirements for these nurses is likely to raise costs to a prohibitive degree.

In this connection a subsequent talk given by Dr. George Earl, councilor for the first district, before the Hospital Association in St. Paul, is of interest.

Must Supply Demand

Dr. Earl said:

"Today there is a shortage of registered nurses for bedside duty, particularly for farm homes and in rural communities. Other factors besides the depression caused unemployment among nurses, first, and now a shortage.

"Previous to the unemployment, training schools had been very active both as to number and size of classes. Then came a period when many schools closed and the remainder reduced greatly the size of their classes.

Emergency

"To meet the resulting shortage which has now become an emergency, hospitals and others who are responsible for the care of the sick have turned to training women with less experience to take up some of the work formerly done by the graduate nurse.

"The economic situation naturally enters into the problem. Training schools must take the responsibility for providing a supply of nurses that will meet the demand. If they do not, others are certain to try to fill the needs."

New Constitution

The new constitution proposed for the first time at this meeting will be studied by all constituent societies during the coming year.

The old constitution called for a year to elapse between the first proposal and the final acceptance of a new one. In the meantime, the new constitution is required to be published in full twice in MINNESOTA MEDICINE and to be sent, also, to all county and district societies at least two months before final action. This routine will be duly followed and opportunity will be given for criticisms.

When final action is taken at the 1937 meeting, additional suggestions and alterations can be incorporated. The new document has been drawn up carefully in accordance with suggestions from Dr. W. E. Woodward, Chicago, Director of the Bureau of Legal Medicine of the American Medical Association, and with a view to the changing requirements of an active organization.

Speaker of the House

One of the major changes proposed by the new document is a Speaker of the House of

Delegates, patterned after the Speaker of the House of Delegates of the American Medical Association. This office will be filled each year though the incumbent will be eligible for re-election. The office is designed to relieve the president who has hitherto presided over the sessions of the House and generally to expedite the large amount of business before that assembly.

The desirability of such an office has been obvious for some time and, at the request of President W. W. Will, a temporary speaker was elected at the Rochester session, anticipating its permanent establishment. The office was given by unanimous vote to Dr. O. E. Locken of Crookston.

Use or Non-Use of the X-ray

Thirty years ago the use of the x-ray for diagnosis was unusual procedure. Today the only excuse for not using this important adjunct in treatment of fractures is the fact that both patient and doctor are far removed from a machine, or that suitable current required for the operation of a machine is not available.

Failure to use the x-ray machine if available, after he has undertaken to treat a patient, may be negligence on the part of the physician. The question is: "Did he exercise such reasonable care in determining whether or not to use the machine as is usually exercised by physicians in good standing under similar circumstances?"

The widespread use of the x-ray has influenced recent court decisions holding that the exercise of ordinary care and skill requires its use in both diagnosis and treatment. Therefore, your Medico-Legal Advisory Committee strongly recommends that x-rays be taken both before and after reduction of a fracture as well as frequently during healing and that the physician, if he deems it necessary, take a picture without request from the patient, even at his own expense. He cannot, of course, be held responsible if the patient refuses to have such picture taken. The committee further recommends that a written interpretation, signed by the interpreter, be filed as a part of the case record, such x-ray films to be considered a part of the hospital's or surgeon's permanent record, available at all times. Nurses and technicians should be told that they must not interpret films

to the patient, this being left to the surgeon in charge.

Ownership of Roentgenograms

A case is cited in the *Journal of the American Medical Association*, March 21, 1935, wherein the defendant company employed the plaintiff, a physician, to treat one of its employees who had sustained an injury to the lower part of the back involving the sacro-iliac joint. On the refusal of the company to pay for the services rendered, the plaintiff brought suit. A judgment was rendered in favor of the plaintiff, and the defendant appealed to the Supreme Court of Michigan.

The defendant declined to pay the bill because the plaintiff refused to deliver certain roentgenograms taken during the course of treatment. The Supreme Court held that the plaintiff was justified in thus refusing to surrender possession of the roentgenograms.

In the absence of agreement to the contrary, roentgenograms are the property of the physician who has made them incident to treating a patient, notwithstanding the fact that their cost is charged to the patient. Their retention by the physician constitutes an important part of his clinical record in the particular case, and, in the aggregate, roentgenograms may embody and preserve much of value incident to a physician's experience. They are as much a part of the history of the case as any other case record made by a physician. Roentgenograms differ little if at all from microscopic slides of tissue made in the course of diagnosing or treating a patient, and it would hardly be claimed that such slides were the property of the patient. Furthermore, continued the court, in the event of a malpractice suit against the physician, the roentgenograms that he has caused to be taken and preserved incident to treating the patient might often constitute the unimpeachable evidence which would fully justify the treatment of which the patient complained. In reaching its conclusion the court relied on the cases of "Corliss v. E. W. Walker Co. (C.C.), 64 F. 280, 31 L.R.A. 283," and "Pollard v. Photographic Company, 40 Ch. Div. 345," in which it was held that the negative of an ordinary photograph, in the absence of an agreement otherwise, belongs to the operating photographer although his use thereof may be restricted.

The judgment in favor of the physician was affirmed. McGarry v. J. A. Mercier Co. (Mich.), 262 N. W. 296.

MEDICO-LEGAL ADVISORY COMMITTEE.

"Medicine as a Business"

The following excerpts are from a recent address by Mr. J. G. Crownhart, secretary of the State Medical Society of Wisconsin, on "Your Practice and the Law."

This brief review of the accomplishments and the position of medicine should be read especially by those who are occasionally dazzled and lured

by the fine phrases and specious arguments of the social revolutionists in medicine.

They constitute a challenge to medical men who have now and then shown a readiness to sacrifice a great tradition and a great service to humanity for self interest.

Relation of Medicine to State Action

"... I am keenly conscious that it has been said that medicine has resisted community and state action in the field of health. Such statements can come only from the grossly misinformed or from those who have not taken the trouble to even glance at the record. I have given you but a part of the record in our own state tonight. Yet, surely, it is sufficient evidence to support the irrefutable assertion that, almost without exception, every law looking towards group action for the advancement of health and the alleviation of disease has come directly from the active individual practitioners of medicine of this state. . . .

"Without detracting from that which has been secured by other groups and professions, I must express the most earnest conviction that no group anywhere has so contributed to the welfare of the American people as have its physicians. . . .

Practitioners and Public Interest

"I am aware of the fact that throughout this discussion this evening I have repeatedly spoken of the public interest. I have done so intentionally for it has been my observation, as I am certain it has been yours, that the interests of practitioners of medicine and those of the public health are joint and indivisible, now and always. As you have benefited the public by your actions through these many years of your organization, so has risen the public respect and esteem for the profession. In times of depression, your financial reward, in common with others, has been cut and cut again but rarely indeed does the community fail to reward the practitioner who earnestly, devotedly and with progress, serves his people. . . .

"During these depression years as a means of promoting their own income there are, I know, those who would have us mark out the American people into real estate subdivisions with flags flying over so-called income groups to indicate what extent of medical service each group should receive and what they should pay for services from A to Z. Some would do this by legislation and others by voluntary insurance plans to insure that which actuaries cannot compute on an insurance basis—for a given group the incidence degree and kind of illness they may suffer and the costs thereof. Each such plan, bill and experiment that we have studied—and our files are full of such careful and comprehensive studies—each of these I say are held forth as being a cure-all because they will be cheap.

Medicine Not a Business

"Gentlemen, if we are to make cheapness the hall mark of medicine then we would return our people to the dark ages when life itself was cheap for no less than life itself is involved in medical service. . . .

"When you abandon present standards for fixed sum payments you enter upon a principle in the operation of which the physician profits most from performing the minimum service; a practice wherein the man who pays hard-earned money for months and years may find the institution that took his payments non-existent when he calls upon it in his time of need. . . .

"Medicine as a business would be more certain in its immediate financial rewards. Medicine if operated as a business would require certain numbers of patients in order that the machine of mass attention might function. Medicine in competition as business, aware of the difficulty of laymen judging poor service from good, would say through competing groups—'come to us and we will do more for less.' Medicine as a business would of course be concerned first with profits and payments in advance.

"You Care for All"

"But medicine as a profession, as it has been and is now practiced throughout the state of Wisconsin, will have none of this. You recognize that illness is peculiarly individualistic and is capable of no mass diagnostic or mass treatment methods. Almost within the month you have declared that it shall be cause for expulsion should any member use collection methods which involve borrowings at legal but high interest rates. Within the last five months you have publicly reaffirmed the age-old tradition of medicine—that you will care for all who seek your service and the cost will be within the means of each to meet. And a Harry Hopkins rises to declare that the service of medicine to the unemployed in these depression years 'is a grand story of service.' Medicine as a profession serves no master but the science and art of medicine and your utmost knowledge of both is brought to bear for the service of all.

No Subdivisions

"Finally you hold that in illness there can be no flags laying out the American people in subdivisions. You hold that the most costly medical service is that which devotes its attention to purchase price. No financial catastrophe is so great as that arising out of needless invalidism or too early death caused by substituting quantity service for quality. Progressive adequacy of medical care for the American people, already far in advance of other nations, has given to our industrial population in 1935 the lowest death rate ever recorded. Continued success lies in never surrendering to those forces which would make a poor business out of a truly great profession."

Exact

WI
board
system
comm
know
budg
sick

Un
a ma
one
count
cal o
ing o

No
with
each
it is
of th

Th
lump
the p
budg

Th
tain
budg
medi
willi
avail

E
for
his

ANAL

Cou

Aitkin
Anok
Beck
Beltra
Bento
Big
Blue
Brow
Carlt
Carve

*N
No
the t
Louis
with

JUN

Exact Figures for Care of the Sick Poor

When physicians and members of county boards sit down together to determine upon a system of medical care for the indigent in their communities, the most important single fact to know is just what proportion of the county's budget for relief will be needed for care of the sick poor.

Until this year, this one pivotal fact has been a matter for guesswork and conjecture. It was one man's opinion against another, with the county officials occasionally suspecting the medical opinion of padding and physicians suspecting official opinion of stinginess and neglect.

Now, thanks to more than a year's experience with SERA and complete figures compiled for each county for 1935 by Mr. Zimmerman's staff, it is possible for both to speak with confidence of the needs of each county for future years.

The figures listed below give, not only the lump sum spent by SERA in each county, but the percentage it represented of the total relief budget for the county.

Thus, county officials can, with reasonable certainty, set aside a similar percentage of their budget for the ensuing year for payment of medical care. Physicians, on their part, will willingly adjust their compensation to the amount available based upon this percentage.

Every member is urged to study these figures for all counties as part of his own education in his responsibilities for care of the sick poor.

STATE RELIEF AGENCY ANALYSIS OF MEDICAL & DENTAL OBLIGATIONS: 1935

County	Total Obligations Incurred	Average Case Load	Medical & Dental* Amount	Per cent	Medical & Dental Per Case
Aitkin	\$ 271,599	887	\$ 22,629	8.33	\$25.51
Anoka	315,204	690	18,236	5.79	26.43
Becker	251,122	873	7,976	3.18	9.14
Beltrami	304,533	1,037	11,547	3.79	11.14
Benton	275,388	567	7,411	2.69	13.07
Big Stone	574,195	739	25,525	4.45	34.54
Blue Earth	173,081	796	9,579	5.53	12.03
Brown	153,858	496	6,493	4.22	13.09
Carlton	198,087	627	10,543	5.32	16.81
Carver	80,600	283	4,734	5.87	16.73

*Not including hospitalization.

NOTE: Information concerning medical and dental care for the three urban counties, namely, Hennepin, Ramsey, and St. Louis, not reported to the State Office in form comparable with the rural counties.

Cass	284,082	1,120	6,252	2.20	5.58
Chippewa	490,099	925	33,486	6.83	36.20
Chisago	151,551	324	9,060	5.98	27.96
Clay	187,834	508	10,821	5.76	21.30
Clearwater	82,638	351	2,829	3.42	8.06
Cook	21,767	69	397	1.82	5.75
Cottonwood	98,623	183	2,377	2.41	12.99
Crow Wing	657,957	1,737	36,084	5.48	20.77
Dakota	422,737	1,008	16,518	3.91	16.39
Dodge	68,420	228	3,403	4.97	14.93
Douglas	368,947	608	26,714	7.24	43.94
Faribault	98,497	303	8,125	8.25	26.82
Fillmore	76,745	308	3,301	4.30	10.72
Freeborn	283,485	564	14,899	5.26	26.42
Goodhue	89,650	293	9,432	10.52	32.19
Grant	163,024	322	11,068	6.79	34.37
Houston	45,192	189	2,704	5.98	14.31
Hubbard	176,231	465	11,752	6.67	25.27
Isanti	155,826	199	4,940	3.17	24.82
Itasca	366,485	1,110	14,224	3.88	12.81
Jackson	43,864	204	2,387	5.44	11.70
Kanabec	196,820	527	13,685	6.95	25.97
Kandiyohi	476,565	750	18,287	3.84	24.38
Kittson	59,010	176	1,900	3.22	10.80
Koochiching	145,107	490	5,990	4.13	12.22
Lac qui Parle	373,842	619	17,365	4.65	28.05
Lake	38,452	168	2,516	6.54	14.98
Lake of the Woods	62,805	178	5,237	8.34	29.42
Le Sueur	68,674	254	2,278	3.32	8.97
Lincoln	295,544	348	6,798	2.30	19.53
Lyon	260,292	526	12,021	4.62	22.85
McLeod	155,118	449	9,140	5.89	20.36
Mahnomen	134,715	429	6,668	4.95	15.54
Marshall	84,483	258	6,885	8.15	26.69
Martin	46,125	283	9,010	19.55	71.84
Meeker	235,519	517	11,812	5.02	22.85
Mille Lacs	406,282	829	15,318	3.77	18.48
Morrison	458,176	993	13,910	3.04	14.01
Mower	114,303	472	13,156	11.51	27.87
Murray	112,961	158	2,106	1.86	13.33
Nicollet	66,623	205	3,561	5.35	17.37
Nobles	83,346	249	9,216	11.06	37.01
Norman	71,008	279	3,149	4.43	11.29
Olmsted	590,833	1,171	41,593	7.04	35.52
Otter Tail	571,039	1,072	14,528	2.55	13.55
Pennington	53,633	236	2,700	5.03	11.44
Pine	260,513	629	10,489	4.03	16.68
Pipestone	140,017	262	3,205	2.29	12.23
Polk	216,172	606	9,181	4.25	15.15
Pope	382,464	636	24,165	6.32	38.00
Red Lake	17,225	72	2,125	12.34	29.51
Redwood	203,475	473	18,045	8.87	38.15
Renville	319,397	522	21,113	6.61	40.45
Rice	254,118	659	11,248	4.43	17.07
Rock	39,881	190	2,958	7.42	15.57
Roseau	94,144	269	6,194	6.58	23.03
Scott	25,641	139	1,339	5.22	9.63
Sherburne	131,904	209	5,760	4.37	27.56
Sibley	38,144	163	2,391	6.27	14.67
Stearns	1,132,117	2,328	35,611	3.15	15.30
Steele	45	..	..	..	..
Stevens	327,418	500	8,851	2.70	17.70
Swift	477,621	760	22,549	4.72	29.67
Todd	414,164	934	21,944	5.30	23.49
Traverse	268,016	283	10,545	3.93	37.26
Wabasha	79,306	323	4,009	5.06	12.41
Wadena	130,398	477	2,204	1.69	4.62
Waseca	110,356	285	4,800	4.35	16.84
Washington	350,194	832	14,536	4.15	17.47
Watsonwan	82,834	199	5,167	6.24	25.96
Wilkin	152,842	191	2,696	1.76	14.12
Winona	268,448	686	10,248	3.82	14.94
Wright	448,993	845	34,438	7.67	40.76
Yellow Medicine	409,356	523	9,270	2.26	17.72

Total Rural Co.'s \$18,867,841 40,950 \$909,356 4.82 \$22.21

Debate Finals

Final results of the high school debates on the question of state medicine are now available and they show a much better record for the negative than earlier returns promised.

Perhaps final appeals spurred physicians to a last minute effort to save the day. Perhaps the thanks go largely to the Women's Auxiliary whose special committee, headed by Mrs. Martin Nordland of Minneapolis, made a special request to members of the Auxiliary to help.

In any case, the final scores showed 38 victories for the affirmative among the regional contests and 32 victories for the negative.

Regional winners were Mankato and Coleraine, both of whose teams had debated on both sides of the subject.

It is interesting to note, however, that Mankato, defending the negative, carried off state honors. The complete list of debates and scores is now available and may be secured by writing to the State Office.

Minnesota State Board of Medical Examiners

Hibbing Quack Sentenced to One Year At Hard Labor

Re: State of Minnesota vs. Ramon L. De Silvio

On May 2, 1936, the Honorable Edward Freeman, Judge of the District Court for the Eleventh Judicial District, sentenced Ramon L. De Silvio to a term of one year at hard labor to be served at the St. Louis County Work Farm following a plea of guilty by the defendant to an information charging him with practicing healing without a Basic Science Certificate.



Ramon L. De Silvio

The defendant, a negro forty-five years of age, had treated a number of patients in Hibbing, Minnesota, and had collected various sums of money, ranging from \$2.50 to \$17.00 per patient. He had falsely represented himself as a chemist and admitted in open court, when questioned by Judge Freeman, that he had only a sixth grade education. He also admitted that he had never studied medicine, pharmacy, chemistry nor any other sub-

ject dealing with the treatment of a sick person. He also admitted to the court that he had been arrested for a similar offense in Boston, Massachusetts. He remained silent when Judge Freeman told him that he could not cure the sick and that he knew it. The defendant had been in Hibbing about six weeks. Letters found on his person indicated that he had also lived at Rockford, Illinois.

The Supreme Court of Minnesota, thirty-one years ago, in a case from St. Louis County, stated in referring to the Medical Act:

"A just enforcement of that act would tend to prevent the most deplorable swindling of the ignorant poor, who can least afford to pay for the luxury of deception, and who are the most likely to be the dupes of ostensible practitioners, whose competency has not been determined by law, and whose moral deficiencies are evidenced by their false pretenses."

The Medical Board wishes to commend Judge Freeman for reaffirming the purpose of having medical laws and having them enforced. Other quacks have been given long sentences but this is the first time that a quack has been given the maximum of one year. The Medical Board also wishes to acknowledge the splendid coöperation given by Mr. John Naughtin, Assistant County Attorney of St. Louis County; Chester Naeseth, Chief of Police; Captain Munter, Sergeant Graves and Detective Phillips of the Hibbing Police Department.

St. Paul Quack Gets Jail Term For Second Offense

Re: State of Minnesota vs. George De Georgopoulos

George De Georgopoulos, fifty years of age, entered a plea of guilty to an information charging him with practicing healing without a basic science certificate before the Honorable C. M. Stockton, Judge of the Municipal Court, at Faribault, Minnesota, on May 16, 1936, and was sentenced to pay a fine of \$500.00 and costs, or serve six months in the Rice County jail. The defendant was unable to pay the fine and was placed in the County Jail to serve his sentence.



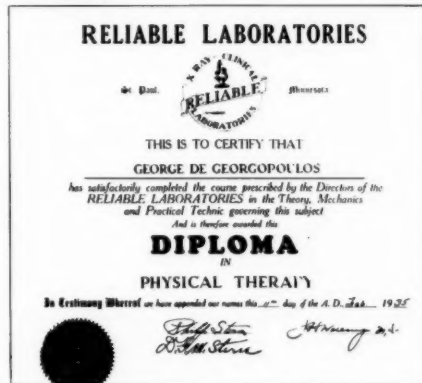
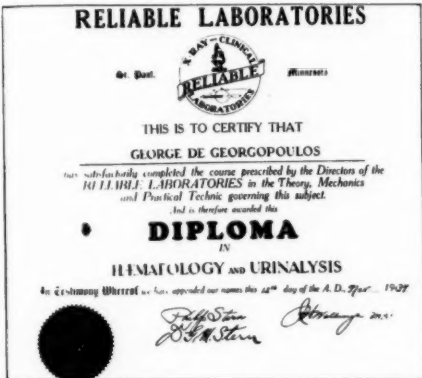
Geo. De Georgopoulos

The defendant had examined and treated a tuberculous patient at Faribault, Minnesota, and had received the sum of \$20.00 in cash. The patient and his family were on relief at the time. The defendant was arrested by the St. Paul Police Department following an investigation made by the State Board of Medical Examiners. In his room at the Euclid Hotel in St. Paul was found a trunk full of medicine and medical instruments. When arrested the defendant stated that he had a license, but produced instead two diplomas bearing the name Reliable Laboratories, St. Paul, Minnesota. One of the diplomas was in Hematology and Urinalysis and the other one in Physical Therapy. He stated that the school was operated by one Philip Stern in the Pittsburgh Build-

ing at Fifth and Wabasha Streets in St. Paul, and that he attended a course for two months to secure the diploma in Hematology and Urinalysis, for which he paid the sum of \$140.00. He stated that he went another month and received the diploma in Physical Therapy, for which he paid the sum of \$15.00.

The defendant admitted having had about twenty men patients at the Euclid Hotel who were examined and treated for various ailments. His specialty was

County. This investigation disclosed that C. A. Plath, a chiropractor from Armstrong, Iowa, and G. H. Alberts, another chiropractor from Mason City, Iowa, and one Theodore J. Hagen, a licensed chiropractor from Pelican Rapids, Minnesota, were attempting to hold a chiropractic clinic for the examination and diagnosis of patients at the Ceylon Hotel on May 11, 1936. The following advertisement was inserted in the Ceylon paper:



Facsimile of diplomas granted by the so-called Reliable Laboratories.

blood and skin examinations, and also examinations for gonorrhea. His charge varied from \$2.00 to \$10.00 per patient. The defendant also admitted receiving \$10.00 for treating a woman at Faribault for eczema. This defendant was arrested in 1929 in St. Paul charged with a similar offense, at which time he entered a plea of guilty and paid a fine of \$250.00. Subsequently he was denied citizenship in Federal Court because of his unlawful practice of medicine.

Medical Board Stops Unlicensed Chiropractic Clinic

Following a report to the Medical Board that two chiropractors from Iowa were going to hold a clinic at Ceylon, Minnesota, an investigation was made in cooperation with Sheriff Wm. L. Roehler, of Martin

CHIROPRACTIC RESEARCH CLINIC

Part of an educational program sponsored by the Chiropractic Research Society, will be held in Ceylon

MONDAY & TUESDAY, MAY 11 & 12

Consultation will be held and analysis and examination made by members of the Chiropractic Research Staff.

No charge will be made for consultation and analysis. Where X-ray is desired a minimum fee will be asked to cover costs.

Latest Chiropractic technique and equipment will be used, including X-ray and Neurocalometer.

As only a limited number can be accommodated in the two days, appointment should be made—Phone 55.

Those taking advantage of this opportunity and wishing further health service will be referred to

DR. C. A. PLATH
ARMSTRONG, IOWA

A postal card containing the following notice was placed in each mail box at Ceylon:

MONDAY AND TUESDAY, MAY 11th and 12th, are the dates of the Chiropractic Clinic, to be held at the Ceylon Hotel, Ceylon, Minn.

Dr. G. H. Alberts of Mason City, Iowa, and Dr. Theo. J. Hagen of the Park Region Health Home of Pelican Rapids, Minn., both members of the Research Clinic Staff, will be in charge of the Clinic. Latest Chiropractic technique and equipment will be used, including X-ray and neurocalometer.

Fail not to take advantage of this health educational service. Find out what may be the cause of your ailment and what chiropractic can do for you. There will be no charge for consultation and analysis, except where X-ray is found necessary.

The Ceylon Hotel management is in charge of local arrangements, and anyone wishing to take advantage of this free offer to consult one or both members of this Clinic Staff should make an appointment as soon as possible at the hotel, or phone 55 to avoid disappointment, as only a limited number can be accommodated in two days.

Following a discussion of the matter in the office of C. L. Erickson, County Attorney of Martin County, a warning was given to Plath and Alberts and they were permitted to return at once to the State of Iowa. These two men are not registered under the Basic Science Law of Minnesota, and have no license to practice healing of any kind in this State, consequently they have no lawful right to practice. Any further violation of the law will result in a prosecution. During the questioning of these men it developed that Alberts had conducted a similar clinic at Spring Valley, Minnesota, last fall. The Medical Board respectfully solicits the cooperation of every member of the medical profession to inform the Board promptly when advertisements similar to the above appear at any time in this State.

OBITUARY

George E. Brown*
1886-1936

We mourn the loss of Dr. George E. Brown. The younger men probably feel this loss most keenly for he was especially their friend and inspired them to clinical investigation.

After graduation, internship, and his marriage to Miss Irma Parker, Dr. Brown settled in Miles City, Montana, where he remained in practice for ten years. During those years he was not content with mere routine but introduced laboratory procedures rarely used in general practice, brought the first fluoroscope to his part of Montana, and began to publish his observations.

In 1921 Dr. Brown became first assistant in a section of the Division of Medicine of The Mayo Clinic. His progress was rapid; he advanced to associate in medicine and to the headship of a section, and later became associate professor of medicine in the post-graduate school. His position on the staff of this institution gave him a better opportunity to develop his bent toward clinical investigation and to apply scientific methods in the diagnosis and practice of medicine.

Dr. Brown's contributions to medical literature began in 1911. From then onward papers and monographs were produced by him and his associates in rapid succession. Reports of approximately a hundred and fifty studies bear his name. In the early years of his career these studies ranged over a wide field of internal medicine but by 1922 his interest in the little known field of blood vascular disease was evident. His contributions to this field in the next thirteen years were of inestimable importance. His mind was literally seething with projects to increase knowledge of this aspect of medicine.

Dr. Brown was a member of many important medical societies. He was active in the scientific work of the Minnesota State Medical Association. He was especially interested in perfecting the organization of the American College of Physicians. He was one of the original committee which initiated the Central Society for Clinical Research and was a member of such honorable bodies as the American Society for Clinical Investigation and the Association of American Physicians.

Dr. Brown was a man of brilliant mind and admirable social qualities; cheerful, confident, tolerant, frank, hospitable, an excellent teacher, and especially a friend of the younger men.

Dr. Brown died young; he was only fifty years of age. We do not know what important discovery may have died with him. Fortunately for medicine

*A tribute to Dr. George E. Brown presented before the general assembly of the Minnesota State Association on Wednesday, May 6, 1936, by Dr. H. Z. Giffin, as Councilor of the First District.

and for the public, however, whatever he knew or suspected he imparted to his associates; therefore, much of his work did not die with him. To Mrs. Brown, to George, Jr., and to Hugh, the members of the Minnesota State Medical Association can say sincerely that they miss him deeply and shall always remember him as a benign influence and an inspiration.

O. A. Oredson
1872-1935

Dr. Oredson of Duluth was born at St. James, Minnesota, in 1872. He studied at Gustavus Adolphus College; later taught school, and for a time was employed as a commercial traveler. He commenced the study of medicine at the University of Iowa, taking his final degrees at Hamline, and his internship at the Bethesda Hospital, St. Paul. He commenced practice in Duluth in 1904 at the age of twenty-eight.

In 1913, Dr. Oredson visited Vienna, and spent some time with Lorenz; from thence to Berlin where he was studying with Bohn when the war commenced. At this juncture he made himself exceedingly useful in assisting American and British visitors in their hurried exodus from Germany. Dr. Oredson was trilingual, a valuable asset which few American doctors can lay claim to, and this gave him an excellent opportunity in the emergency of August, 1914. Then after leaving Berlin the doctor spent some time with Lane in London, returning to Duluth to specialize in surgery and gynecology. He died in Duluth, November 25, 1935, after suffering for a year or two from a cardiac disability.

Aside from his practice Dr. Oredson enjoyed hunting and his home, his books, his dogs and garden. He wrote a play which enjoyed an amateur presentation, and several poems of merit.

His father died when he was a small boy. The family was large and their means limited; and so working his way slowly through college and medical school he lived a somewhat broader life than the average medical man is privileged to enjoy.

Henrik K. E. Nissen
1864-1936

Dr. Henrik Nissen was born in Norway and graduated from the medical school of the Royal University of Oslo. In 1889 he came to the United States and practiced at La Crosse, Wisconsin, and for a time at Albert Lea, Minnesota. He then returned to Europe to study in Vienna and Berlin before coming to Minneapolis, where he had practiced his specialty of eye, ear, nose and throat diseases since 1904.

Dr. Nissen was a member of the Minnesota State Board of Health for two terms, beginning in 1894. As a hobby he studied geology and a year ago published a geological treatise entitled "The Origin of the Moon," which attracted much favorable mention on the part of scientists.

Dr. Nissen died at the age of seventy-two on May 7.

1936. F
a summ
tario.
Medica
cal Ar
survive
and El
Franci
and tw
Philad

Geor
18, 190
School
College
of Min
medica
After
and co
Sanato
staff a

Whil
work i
sented
Associ

A m
was al
the Ho
and A

Dr.
Elizab
H. Du

Dr.
18, 19

Dr.
as a b
in Wi

After
College
superi
apolis,
neapol
fices f

A r
Dr. Je
stone
hospit
severa

Dr.
Earle
Jencke
Colvin

JUNE,

• OF GENERAL INTEREST

1936. He had lived in Minneapolis since 1904, and had a summer home on Rainy Lake at Fort Frances, Ontario. He was a member of the Hennepin County Medical Society, Minnesota State and American Medical Associations until 1927, when he resigned. He is survived by his wife; four daughters, the Misses Dagny and Elizabeth Nissen of Minneapolis, and Mrs. Carl Francis and Mrs. Robert Burgess, both of New York; and two sons, Henrik E. of Minneapolis and Arvid of Philadelphia.

George R. Duncan
1903-1936

George R. Duncan was born in Saint Paul, September 18, 1903. After graduating from Mechanic Arts High School in Saint Paul in 1919, he attended Dartmouth College for two years before entering the University of Minnesota Medical School, where he received his medical degree in 1927.

After serving his internship at the San Francisco city and county hospital, Dr. Duncan went to Glen Lake Sanatorium, where he was a member of the medical staff at the time of his death, April 6, 1936.

While at Glen Lake, Dr. Duncan carried on research work in the fever treatment of tuberculosis and presented his findings before the National Tuberculosis Association and other medical groups.

A member of the Phi Beta Pi medical fraternity, he was also a member of the Minnesota Trudeau Society, the Hennepin County Medical Society, Minnesota State and American Medical Association.

Dr. Duncan is survived by his wife and daughter, Elizabeth Jane; by his parents, Mr. and Mrs. Charles H. Duncan; and a sister, Jean Duncan of Saint Paul.

H. C. Jenckes
1853-1936

Dr. H. D. Jenckes, Pipestone, died at his home May 18, 1936, at the age of eighty-three.

Dr. Jenckes was born in New York state. He came as a boy to the middle west, where his family settled in Wisconsin.

After graduating from the Physicians and Surgeons College at Chicago, Dr. Jenckes served for a time as superintendent of the St. Anthony Hospital, Minneapolis, an institution now out of existence. From Minneapolis he moved to Jasper, where he held public offices for a time.

A resident of Pipestone for about thirty-five years, Dr. Jenckes served for a time as health officer of Pipestone County. He also was superintendent of the Indian hospital there and physician at the Indian school for several years.

Dr. Jenckes is survived by his widow and a son, Earle D. Jenckes of Saint Paul; a brother, Walter Jenckes of Freeport, Illinois; and a sister, Mrs. Len Colvin of Marshfield, Wisconsin.

OF GENERAL INTEREST

Dr. Frederick A. Engstrom of Wanamingo, Minnesota, is chairman of the Goodhue County Democratic Committee.

* * *

Dr. and Mrs. W. H. Rumpf of Faribault sailed May 2 from New York for a four months' vacation in England.

* * *

Dr. J. T. Christison of Saint Paul has been named grand viceroy of the Red Cross of Constantine, the world's oldest Masonic organization.

* * *

Dr. O. E. Sarff has resigned his position as head of the hospital at Buhl, Minnesota, and is now located in Virginia, Minnesota, where he is engaged in private practice.

* * *

Dr. A. F. Branton of Willmar assumed his duties as president of the Minnesota Hospital Association following the annual meeting of the Association in Saint Paul May 14 and 15.

* * *

Dr. A. M. Aanes of Red Wing was re-elected for a term of five years to the Board of Directors of the North American Life and Casualty Company at a meeting held in May at the company offices in Minneapolis.

* * *

Dr. A. W. Shaleen of Hallock, Minnesota, was recently appointed physician in charge of the Bronson Work Camp, near Hallock. Dr. F. F. Stocking of Hallock will take care of any necessary surgical work at the camp.

* * *

Announcement has been made of the engagement of Miss Naomi Aubin, daughter of Dr. and Mrs. Alexander Aubin of Minneapolis, to Dr. Joseph B. Gaida of St. Cloud. The wedding will take place late in the summer.

* * *

Dr. S. A. Slater of Worthington was re-elected to serve another two-year term on the Board of Directors of the National Tuberculosis Association at the annual meeting held in New Orleans the latter part of April.

* * *

Dr. and Mrs. C. Gordon Watson of the Soudan Hospital, Soudan, Minnesota, have returned from Europe, where Dr. Watson took a postgraduate course in surgery at Vienna. Dr. and Mrs. Watson visited several countries on the Continent before returning to the United States.

Dr. P. C. Pilon of Paynesville, Minnesota, was honored recently at a testimonial dinner given on the completion of half a century of active service as a physician. Dr. Pilon was graduated from medical college in Victoria, B. C., May 12, 1886, and came to Cold Springs, Minnesota, the following year. He later practiced at Richmond and came to Paynesville in 1897.

* * *

Dr. E. E. Novak of New Prague, Minnesota, candidate for the Democratic gubernatorial nomination, was recently honored at a testimonial dinner by citizens of New Prague. Dr. Novak was characterized as an "outstanding physician, educator, conservationist, agriculturist, community builder and good citizen" in the tribute paid to him at that time.

* * *

Dr. J. R. Kingston of Deer River recently returned from a tour of inspection of public health work in Michigan and has taken over his duties as director of public health for the northern Minnesota district, an appointment which he received from the State Board of Health in April. Dr. Kingston's headquarters will be in Grand Rapids, Minnesota, but he will continue to keep his offices at Deer River with the assistance in this practice of another doctor.

* * *

Dr. Arrah B. Evarts, who retired June 1 from the staff of the Rochester State Hospital, where she has been senior assistant physician, was honored at an entertainment given May 15 by the employees of the hospital, who presented her with a gift of silver. Dr. Evarts joined the staff of the Rochester State Hospital in 1918. Previous to that time she had served six years as a member of the staff of St. Elizabeth's Hospital, District of Columbia. She is a native of Minnesota, having been born at Dodge Center and received her medical degree from Hamline University in Saint Paul. Dr. Evarts will continue to live in Rochester, where she has a home just west of the city.

* * *

Following a period of service of forty-three years at the University of Minnesota, Dr. Charles A. Erdmann, instructor of anatomy at the University of Minnesota medical school, will retire at the end of the present school year, June 30. Dr. Erdmann is known to thousands of alumni and medical students at the University and for the past few years has enjoyed teaching the sons of some of his earlier students. In a recent newspaper interview he stated that medical students have changed but little in forty-three years: "The type of man the profession attracts is always the same, a good student, not necessarily a brilliant one, but a person imbued with the ideals of service to mankind. It has always been the same."

Clinical Pathologic Seminar

(Continued from page 381)

sisted for about twenty years. The antisyphilitic treatment which the patient received apparently did not delay the progress of the disease but no antisyphilitic treatment was given during the first eighteen years of its course. Syphilitic aortitis with involvement of the aortic valve is one of the most frequent causes of death in syphilitic patients.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for June

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 9:45 A. M. every Tuesday over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

- June 2—Clothing and Health
- June 9—The Liver Treatment of Anemia
- June 16—The Expectant Mother
- June 23—Adult Education
- June 30—Carbohydrate and Dental Caries

Medical Library Association

The Ramsey County Medical Society, Saint Paul, will be host to the Medical Library Association at its annual meeting June 22 and 23, 1936.

Librarians from all over the United States and Canada will attend. Physicians are invited to attend the sessions. On Monday, June 22, Dr. W. W. Francis, from the Osler Library of McGill University, will be the speaker, and on Sunday, June 21, Dr. and Mrs. W. H. Van der Weyer will entertain the visitors informally at Grey Cloud Island.

Northwestern Pediatric Society

The annual meeting of the Northwestern Pediatric Society was held at the University Club, St. Paul, on May 7, 1936. The following officers were elected: Dr. A. V. Stoesser, Minneapolis, President; Dr. R. L. Wilder, Minneapolis, Vice President; and Dr. Roger L. F. Kennedy, Rochester, Secretary-Treasurer. The guest speaker, Dr. Thomas B. Cooley of Detroit, gave a most interesting presentation on "Constitutional Hemolytic Anemias."

Minnesota Radiological Society

The annual meeting of the Minnesota Radiological Society was held in connection with the meeting of the Minnesota State Medical Association at Rochester, Minnesota, May 4, 1936.

The Russell D. Carman Memorial Lecture was delivered by Dr. Willis F. Manges of Philadelphia on the subject, "Foreign Bodies and the Use of X-Ray Examination in Their Localization and Removal."

At the annual dinner Dr. Manges addressed the members of the Society on "The Future of Radiology."

Election of officers for the coming year resulted as

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

follows: President, Dr. J. Richards Aurelius, St. Paul; Vice-President, Dr. Walter H. Ude, Minneapolis; Secretary-Treasurer, Dr. Leo G. Rigler, Minneapolis.

LEO G. RIGLER, M.D., *Secretary*.

Dinner to Honor Nine Distinguished Servants of the Medical School

On the evening of Wednesday, June 10, at 6:30 p. m., a formal dinner will be held in the ballroom of the Minnesota Union to honor nine men of the teaching faculty of the Medical School of the University of Minnesota who will retire from active teaching at the end of the current year:

Dr. James T. Christison	Dr. Charles H. Mayo
Dr. Charles A. Erdmann	Dr. John T. Rogers
Dr. James S. Gillfillan	Dr. John L. Rothrock
Dr. Thomas B. Hartzell	Dr. Franklin R. Wright
Dean E. P. Lyon	

On this occasion also, a portrait of Dean Lyon, a gift of the heads of the departments and directors of the divisions, will be presented to the Medical School of the University.

Anyone who would like to attend is cordially invited. Wives are also included in this invitation. The cost of the dinner is \$2.00 per plate. Those interested in coming should notify Dr. J. C. Litzenberg's office at the University, at their earliest convenience. Reservations can not be assured after June 6.

THE COMMITTEE ON ARRANGEMENTS.

Hennepin County Society

Dr. Jalmar H. Simons was named president of the Hennepin County Medical Society at the annual meeting held May 4, and will take office at the society's annual meeting in October. Dr. F. G. Benn, newly-elected first vice president, will be in charge of arranging the scientific programs of the society when these are resumed in the autumn.

Other new officers are: Dr. C. E. Proshek, second vice president; Dr. W. H. Aurand and Dr. C. J. Ehrenberg, executive committee; Dr. D. P. Head and Dr. O. W. Yoerg, board of censors; Dr. F. A. Erb and Dr. R. T. La Vake, board of trustees; and Dr. Martin Nordland and Dr. J. S. Reynolds, ethics committee.

Delegates to the 1937 convention of the Minnesota State Medical Association include Dr. A. E. Cardle, Dr. Gilbert Cottam, and Dr. O. S. Wyatt, with Dr. R. H. Creighton, Dr. Martin Nordland and Dr. A. A. Wohlrabe as alternates.

Red River Valley Society

Fifty physicians from the Red River Valley assembled in Crookston April 28, 1936, for the annual dinner meeting of the Red River Valley Medical Society, which was held at the Red and Gold room of the Hotel Crookston.

Wives of the physicians joined them for the dinner

and later went to the J. F. Norman residence for a business session and an informal evening of bridge.

The physicians heard an address by Dr. William T. Peyton of the University of Minnesota school of medicine on "Tumor of the Breast." The address was illustrated by stereopticon slides. Physicians were present from Ada, Fosston, Oslo, Thief River Falls, Red Lake Falls, Warren, and other towns north to the Canadian border, and east of Crookston.

The Women's Auxiliary of the society held a business session at which Mrs. Norman was elected president; Mrs. C. W. Froats of Thief River Falls, first vice president; Mrs. C. H. Holmstrum of Warren, second vice president; Mrs. W. G. Paradis of Crookston, secretary; Mrs. G. A. Morley of Crookston, treasurer; and Mrs. W. J. Wiltrout of Osseo, corresponding secretary.

Upper Mississippi and St. Louis County Societies

A joint meeting of the Upper Mississippi Medical Society and the St. Louis County Medical Society was held Saturday afternoon and evening, April 25, at the armory at Aitkin, where a banquet was served following the meeting. The doctors and wives of Brainerd attended, also Dr. and Mrs. A. B. Rosenfield of Pequot.

The Women's Auxiliary met at the same time with Mrs. B. A. Smith, Crosby, as president, and Mrs. J. P. Hawkinson, Crosby, as secretary. Mrs. E. G. Hubin of Deerwood is treasurer. The group met at the home of Mrs. B. W. Kelly for the evening entertainment.

Minnesota Hospital Association

Those who attended the Minnesota Hospital Association convention at the Lowry Hotel, Saint Paul, May 14 and 15, unanimously agree that it was one of the most outstanding conventions in the history of the state Association, from the standpoint of number in attendance (412 registrations) and for the excellent papers submitted.

The Minnesota Record Librarians Association, The Minnesota Dietetic Association, The Minnesota Anesthetists Association, The Minnesota Association of Social Workers and the Superintendents of Hospital Nurses' Training Schools met simultaneously interlocking their programs with the hospital conference.

Mr. Victor Anderson, president of the Association, opened the convention with a request for reports of the standing and special committees.

The Nominating Committee presented the following officers:

President-Elect—Sister M. Patricia, O.S.B., Supt., St. Mary's Hospital, Duluth
First Vice President—Peter D. Ward, M.D., Supt., Chas. T. Miller Hospital, St. Paul
Second Vice President—H. A. Burns, M.D., Supt., State Sanatorium, Ah-Gwah-Ching
Treasurer—Ray Amberg, Supt., University Hospital, Minneapolis
Trustees (for 2 years)—A. G. Stasel, Supt., Eitel Hospital, Minneapolis; S. R. Lee, M.D., Supt., Ancker Hospital, Saint Paul
Joseph G. Norby, Supt., Fairview Hospital, Minneapolis, to fill unexpired term of Dr. Peter Ward for one year.
Mr. J. J. Drummond, Mgr., Worrall Hospital, Rochester, is the other trustee whose term expires in 1937.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

No other nominations being made, the secretary was requested to cast the ballot and the above named officers were elected.

Dr. A. F. Branton of Willmar, elected to the office of president-elect last year, will assume the duties of president, and Mr. Arthur M. Calvin will continue as secretary.

The *Constitution and Rules Committee* submitted a recommendation to incorporate the Minnesota Hospital Association, which was voted upon and unanimously accepted.

The report of the *Insurance Committee* gave a brief résumé of the insurance requirements of hospitals.

The report of the *Membership Committee* showed that our membership totaled 167.

The *Nursing Committee* report provided information as to the requirements now imposed upon hospital nursing training schools.

The *Public Relations Committee* gave a very interesting report of the year's activities. During National Hospital Day week over sixteen broadcasts were given on radio stations, publicity in the newspapers was given daily and all hospitals were cooperating in holding open house on National Hospital Day with special types of services and clinics. Special memorial services were held in memory of Mathew Foley, the founder of National Hospital Day.

One of the chief subjects which caused much concern was that of the present emergency of a shortage of nurses and the program of increasing the educational standards of nursing education.

Business Session:

It was recommended to the Convention that the 1938 meetings of the American Hospital Association and allied associations that meet simultaneously with the American Hospital Association be invited to hold their convention in St. Paul.

The Committee submitted also the following resolutions:

"WHEREAS the members of the Minnesota Hospital Association duly assembled in Duluth, Minnesota, May 23 and 24, 1935,

"AND WHEREAS it was deemed advisable at such convention that the Association incorporate under the laws of the State of Minnesota applicable to such an association,

"BE IT THEREFORE RESOLVED by the members of the Minnesota Hospital Association duly assembled in the City of St. Paul May 14 and 15, 1936, that the Articles of Incorporation which have been duly prepared by the Committee for this purpose be and are hereby accepted and approved by this convention and that it be the instruction of the convention that the officers of the Minnesota Hospital Association proceed immediately with the incorporation." The resolution was adopted by unanimous vote.

"RESOLVED, that the Minnesota Hospital Association favors the efforts to secure legislation setting aside a portion of the gasoline or license tax money to be available for highway accident cases served in our Hospitals."

"RESOLVED, that the Minnesota Hospital Association favors legislation licensing hospitals and the selling of standards on the basis of the outline as prepared by the Minnesota Medical Association."

"RESOLVED, that the Minnesota Hospital Association approve the continuance of the policy of employing a paid representative during legislative sessions."

"RESOLVED, that the Committee on Publications be instructed to make available to the membership the excellent committee reports and papers."

"RESOLVED, that the policy of holding joint meetings with the allied professions is highly approved and should be extended further."

"RESOLVED, the Minnesota Hospital Association expresses its appreciation to our distinguished guests, Dr. Robert Buerki, Dr. Malcolm T. MacEachern, Miss E. Muriel Anscombe, Dr. F. G. Carter, Dr. Caldwell, and Mr. Paul Fesler."

"RESOLVED, that the Minnesota Hospital Association express its appreciation to the Lowry and Saint Paul Hotels for the excellent care given the members."

"RESOLVED, that the Minnesota Hospital Association express to the citizens of St. Paul and to His Honor, Mayor Gehan, its appreciation of their generous hospitality, and to the press for its cooperation."

"FINALLY, BE IT RESOLVED, that the Minnesota Hospital Association express to the officers and various committees its appreciation of their efforts which have made this 1936 meeting one of the best."

A motion was made and carried that the Economics Committee provide a study of the per capita cost per

day of hospitals, also personnel practices and procedures (such as salaries, vacation leave, et cetera).

It was moved, seconded and carried that the association issue a monthly publication to be named "The Minnesota Hospitals" and that the publication committee be instructed to proceed with same and that all details relative to its publication, advertising and similar responsibilities, in addition to whether the publication should be published twelve times or nine times annually, be left with this committee.

A motion was made and carried that the 1937 convention of the Minnesota Hospital Association be held in Rochester.

The following committees were instructed to include in the next year's reports as follows:

Insurance Committee to include malpractice and cooperate with the medical society relative to the reducing of malpractice insurance rates.

Publication Committee to include a nine or twelve month bulletin, the back page to be given over to advertising.

Legislative Committee to proceed with legislation on licensing of hospitals; also to secure legislation if possible in regard to securing funds from the gas and auto license tax to pay for indigent individuals who have received injuries through automobile accidents and thereby distribute the funds to hospitals in proportion to the amount of service rendered to these cases.

Public Relations Committee was instructed to provide for more frequent radio talks during the year.

Saturday morning was given over to a golf tournament. Prizes were provided by the Physicians and Hospitals Supply Company and Brown and Day, Inc. The three low scores and those receiving prizes were as follows:

Arthur M. Calvin, St. Paul, with low score, total 82.

H. J. Mitchell, Rochester, second, total 83.

Dr. Peter D. Ward, St. Paul, third, total 86.

The high winds which provided a continuous gale over White Bear Lake provided a most difficult day in which to play.

Those partaking in the tournament voted unanimously to invite the women golfers from the hospitals of the state of Minnesota to participate in the next golf tournament, the past tournaments having received no competition among the women golfers.

Trichloroethylene in Angina Pectoris

A report appearing in the Associated Press news, December 30, 1935, contained the following statements:

"Instantaneous relief for the pain of angina pectoris and complete cure for most sufferers from the disease was claimed today by Dr. John C. Krantz, Jr., of the University of Maryland in a report which he read to the American Association for the Advancement of Science. The cure, he said, is a drug called trichloroethylene, one cubic centimeter of which is snuffed into the nose when the pains and heart compression of angina pectoris begin. It gives relief within one second."

An inquiry was sent to John C. Krantz, Jr., Ph.D., professor of pharmacology at the University of Maryland School of Medicine. Dr. Krantz replied as follows:

"My associates and I reported at the Section of Medical Sciences of the American Association for the Advancement of Science the mechanism of the action of trichloroethylene in the treatment of angina pectoris, which was studied clinically in the institution of Dr. William Love, Jr. . . .

"It is unfortunate that the Associated Press misinterpreted the presentation and stated that we had discovered a cure for the disease. Dr. Love's patients were relieved in most cases from the distress and apprehension of angina pectoris by the inhalation of 1 c.c. of the drug, morning and evening. I shall be pleased if you will emphasize, to those who inquire from you, the fact that we have not discovered a cure for angina pectoris."

It may be pointed out that trichloroethylene is a drug to be prescribed with caution. (J. A. M. A., February 8, 1936, p. 485.)

TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

Meeting of March 5, 1936

The President, DR. F. A. OLSON, in the Chair

THE regular monthly meeting of the Minneapolis Surgical Society was held in the lounge of the Hennepin County Medical Society rooms on March 5, 1936. The meeting was called to order by the President, Dr. F. A. Olson, at 8:00 p. m. There were forty-two members present.

The following scientific program was presented:

LYMPHO-EPITHELIOMA

WILLIAM T. PEYTON, M.D.
Minneapolis

It is possible that there is no such entity as "lympho-sarcoma." After reviewing some of the literature prior to 1928 on lymphoepithelioma, New and Kirch² dismiss the whole question of there being such an entity as "lymphoepithelioma" by the statement that these tumors are classified by Broders as grade IV squamous cell carcinoma. Ewing,³ in 1928, calls them transitional cell carcinoma, which he apparently considers the same as the so-called "lymphoepithelioma." Cutler,¹ in 1929, recognized two types of lesions: (1) transitional cell carcinoma in which there were no lymphocytes; and (2) lymphoepithelioma in which there are syncytial masses with rich infiltration of lymphocytes. The latter is more rare.

The term "lymphoepithelioma" was applied to these tumors in 1921 by Schmincke⁷ and Regaud.⁶ The name is derived from the term "lymphoepithelial tissue" which was used by Jolly⁵ in 1911 to designate the mucous membrane in which lymphoid tissue is developed, such as the tonsils. That certain tumors of the pharynx have peculiar clinical manifestations was noted by New⁴ in 1921.

Regardless of the term by which these tumors are designated, it is of the greatest practical importance that they have specific clinical features. In brief these are: (1) enlarged cervical lymph nodes with small or often non-demonstrable primary lesion at the time they are first seen, this primary lesion appearing in a recognized form many months later; (2) symptoms referable to the ear, such as deafness, pain, or tinnitus aurium; (3) pain over the distribution of the fifth nerve; (4) other cranial nerve involvement, especially paralysis of the ocular muscles.

The most frequent site of the primary lesion is in the region of Waldeyer's tonsillar ring, being most frequent in the palatine tonsils. The second most frequent site is in the lateral wall of the pharynx. The primary lesion is frequently non-ulcerated until late in the disease. Distant metastases occur, especially in the retroperitoneal lymph nodes. Cases are reported in which metastases occurred to the liver and to the bones.

These tumors are very radio-sensitive, and if adequately treated before wide dissemination has occurred a good prognosis for permanent cure is offered.

Twenty-two cases of this type of lesion from the University Hospital records are reported; twenty-one of these diagnoses were made by biopsy, and one was a clinical diagnosis. The duration of symptoms from onset to treatment was 9.5 months; the shortest, 1.5 months; the longest, 60 months. Eight patients are still living; fourteen are dead. The site of the primary lesion was in the tonsil in fifteen cases, in the pharynx in four, in the lingual tonsil in two, and in one case the pharynx, tonsil, and tongue were so diffusely involved that it was impossible to determine the exact site of the primary lesion. Seventeen (77 per cent) had metastasis when admitted; five of these are still living. Five (23 per cent) did not have demonstrable metastasis when admitted; three of these are living.

X-ray therapy alone was used in the treatment of fifteen cases, radium alone in the treatment of one case, and both x-ray and radium was used in six cases. These patients were treated too recently to be of much value in determining the final results of treatment in this type of tumor. The longest survival without recurrence in this group is four years.

Bibliography

1. Cutler, M.: Radiosensitive intra-oral tumors. Arch. Surg., 18:2303, 1929.
2. Ewing, James: Some phases of intra-oral tumors with special reference to treatment by radiation. Radiology, 9:359, 1927.
3. Jolly, J.: Les organes lympho-épidéaux. Comp. Rend. de l'Association des Anatomistes, 13:164, 1911.
4. New, G. B.: The relation of nasopharyngeal malignancy to other diagnoses. Minn. Med., 4:419, 1921.
5. New, G. B., and Kirch, W.: Tumors of the nose and throat. Arch. Otolaryng., 8:600, 1928.
6. Reverchon, L., and Coutard, H.: Quoted by Cutler in Arch. Surg., 18:2303, 1929.
7. Schmincke, A.: Ueber lympho-epitheliale Geschwulste. Path. Anat. u.z. Allg. Path., 68:161, 1921.

Discussion

DR. ARNOLD SCHWYZER: I think I saw one of these patients, but we did not make the diagnosis of this special form of carcinoma. There was an enormous tumor coming down from the nasopharynx and invading the posterior pharyngeal wall. The man was brought to the office. He was choking, he was blue and could hardly get any air. He was sent to the hospital in a hurry.

When he was in the operating room I tried to look into his throat, but he choked completely, became unconscious and was dying. At the last moment we made a tracheotomy. It was a very soft tumor that pushed the soft palate forward; nevertheless the uvula could not be seen. The mass was large and bled when manipulated but was not ulcerated. It reached clear up to the base of the skull. We did the only thing to do, packed the entrance to the glottis, then with two fingers in the mouth peeled the whole mass out and then packed the pharynx tightly with a large piece of gauze. This checked the bleeding very well. After a number of minutes this gauze was replaced by one which enclosed 50 mgr. of radium. All this was done on the unconscious patient. There was neither time nor need of an anesthetic. The patient gradually came

to again and recovered. He was well one and a half years later. He came to the office to have his wife examined, but refused to be examined himself, declaring he was well. He seemed all right and was breathing well. There were no metastases. Later on, I am told, he had a recurrence. He went to his doctor, who used injections of some kind. The patient died about two and a half years after the operation. I was surprised how well the radium had seemed to work.

CARCINOMA OF THE STOMACH

ARNOLD SCHWYZER, M.D.

(by invitation)

Saint Paul

When we read in a recent statistical study (Am. Jour. Surg., Feb., 1936) that annually there are in the United States approximately forty thousand deaths from cancer of the stomach, and remembering that early recognition and competent surgery offer at present the only hope for the patient, we all are surely impressed by this enormous responsibility. It should, therefore, be repeated again and again that any patient, and particularly if he be in the neighborhood of, or over, fifty years of age, must be carefully investigated if he comes with stomach complaint of more than ephemeral character. Dr. Lahey's statement before you a month ago that every such patient who shows no marked signs of improvement after a week's medical care should have an x-ray study without delay cannot be too heartily emphasized.

Ulcer patients have very often a long history of complaints with intervals of considerable relief. Patients with cancer give more often a history of a rather recent start of the symptoms with a more steady and increasing discomfort. An indolent patient may make little of the early symptoms. This is one of the causes of fatal delay on the part of the patient especially in those cases where the inlet and outlet of the stomach are not early affected. At times we might be misled by a positive statement of the patient that his troubles began with some acute transitory disturbance, febrile or intestinal or after eating a certain food.

One often hears that the ulcer patient is afraid to eat while the cancer patient can't eat. However, there are exceptions. I well remember an instance in my early days of practice. A fifty year old German with an enormous heart, cyanosis and extreme dropsy knew he was going to die. He expressed the wish to get a bottle of beer with a good portion of Limburger cheese and rye bread, which I procured for him. "That was a real feast" he told me the following morning and was still enjoying the memory of it. A week later he died and at autopsy we found to our surprise besides the cor bovinum with its secondary lesions an advanced carcinoma of the stomach. With this story I am trying to emphasize the frequent unreliability of the symptoms and history. The insidious feature is that early carcinoma of the stomach per se does not give any symptoms, and that it reveals itself only by some secondary signs such as bleeding, obstruction, inflammation, and so forth, which are not early features. Let us, therefore, not lose much time over a discussion of the history beyond the few points mentioned before.

The previously stated demand that any patient in the cancer age whose gastric distress is not much relieved within a week's time should be subjected to an x-ray examination should be supplemented by the demand that the examination be made by an *experienced* roentgenologist. But even this statement gives no sufficient security against a sad error. We cannot rely much on the cancer age. Carcinoma of the stomach does not occur so very infrequently at an age below forty.

If the diagnosis of ulcer had been definitely established some time before, we must not take it for granted that all the symptoms which later follow are due only to this ulcer. When a more continuous discomfort with a decline of the general health comes on, when the appetite begins to fade and the food distress is not so dominant we already have squandered the most valuable time and a repeated x-ray examination which was delayed too long, will now perhaps show a neoplasm already advanced.

As the roentgenologic observation is by far the most important and most reliable, though not entirely infallible, diagnostic weapon, we should not be stingy with these examinations and should insist on repetition where necessary. Not only coarse changes of contours but even small filling defects are seen, and a competent roentgenologist is at times even able to notice some localized rigidity of the otherwise perhaps rather normal appearing stomach walls. This he recognizes by observing the progress of peristaltic waves. The x-ray, therefore, may let us recognize a carcinoma before any marked tumor has formed. It lets us recognize gastric malignancy much earlier than all other tests which are for more advanced conditions and therefore do not interest the surgeon very much. I even have almost a grudge against them as they have caused at times inexcusable delay and covered up the diagnosis with a brilliant sheen of scientific thoroughness. Gastric analysis tells us painfully little in the conditions where we really need help, that is in the early cases. The tannic acid test of Rosenkrantz may however well be mentioned. He claims that two to three grains of the said astringent causes the gastric pain to disappear completely for a short period in the cases of ulcer while there is no effect if the pain is caused by carcinoma. Today it is the x-ray examination which is of paramount importance for the establishment of the diagnosis.

Now comes a different problem which x-ray examination often cannot decide; this is the decision as to operability in a given case. The age is not of first consideration. However, the general condition must be thoroughly appraised. We shall not fail to palpate first of all the supraclavicular areas for enlarged glands and then the Douglas pouch through the rectum for possible pelvic peritoneal metastases. These two things, as simple and rudimentary as they appear, may well be mentioned because I have seen uncomfortable situations caused by their neglect.

But let us say the operation has been decided upon. The patient must now be brought into the best possible condition within a short time. His blood is the first consideration. If the hemoglobin is below 75 per cent,

or especially if below 65 per cent, a transfusion will be necessary. But in addition he has to be supported by a sufficient amount of fluid and chloride of sodium, particularly in the cases where much vomiting has caused a loss of chlorides. If the nutrition had suffered, the liver is depleted of glycogen, and glucose in considerable quantities must be given. Bleeding and coagulation time may require the administration of calcium salts, though here too a transfusion will do best. I do not see it mentioned as a rule that intravenous sodium citrate is a powerful means to improve coagulation. In some cases a transfusion of citrated blood has therefore a particularly good influence. However, to get this double benefit such transfusion should not be given more than twelve hours before operation, because this artificially increased coagulability due to the sodium citrate soon disappears.

If the patient is suffering from a pyloric growth with considerable retention of his food and perhaps even a marked dilatation of the stomach, repeated gastric lavage is in order. If there is no tendency to bleeding the addition of twenty or thirty drops of hydrochloric acid to a quart of water used for the lavage adds a disinfecting quality. If we then give only strained gruels and principally Bulgarian sour milk the gastric flora will be favorably influenced. In addition to this, as mentioned, intravenous saline with 5 or 10 per cent glucose will be given. If there is a tendency to bleeding during this preparatory time a styptic fluid, called sistosan, prepared by Dr. Pancaro of Sudbury, Ontario, may give gratifying results. I intend to speak of this preparation in connection with the post-operative management.

We now come to a short discussion of the operation itself. The anesthetic of choice for us for the last six years has been spinal anesthesia. With spinocain, or half spino- half pantocain, from 2 to 2.5 c.c. and turning the patient clear over on his stomach, with the fourth or fifth dorsal spine as the highest point, as I described it in the December number 1930 of MINNESOTA MEDICINE, we have had very satisfactory results. When spinocain is used, the turning over and elevating the body greatly helps to bring the anesthetic to the area wanted. There is no uncertainty as to this effect. We have observed the selective localization in many hundreds of cases. If the operation lasts somewhat too long for the duration of the anesthetic, we have several times done with satisfaction what Maxeiner recommended, i.e., injected the abdominal walls with novocain before starting their closure. If during the work on the stomach, some pain should occur, local novocain infiltration of the gastro-hepatic ligament is advisable.

The incision is made to the right or left of the midline, with the anticipated difficulties in mind. Balfour's left sided incision is of advantage in case we have to go far up on the lesser curvature. In operating near the cardia, cutting of the costal cartilage, preferably from the abdominal side, improves the accessibility to a considerable degree.

The first thing then is a survey of the condition, the extent of the growth, its possible fixation and the extent of lymphatic involvement. The latter is the

most important for the ultimate prognosis. The x-ray has given us as a rule reasonably good information concerning the extent, though it will often be found to be greater than demonstrated on the film. As to the fixation of the growth, we should not be too timid, particularly in the absence of widespread lymphatic invasion. I received recently word of the death on December 5, 1935, of a patient over eighty years old, on whom I had made in September, 1915, a resection of the stomach for carcinoma which necessitated the removal of a piece of liver and some pancreas. The carcinoma was located at the lesser curvature and the posterior wall. The absence of lymph node involvement had made me risk an extensive resection. According to a letter from his daughter he had "no trouble with his stomach. Death was due to arteriosclerosis."

If the tumor is at the pylorus and does not reach far to the left, a Billroth I gives an ideal result. I shall show you the sketch of a case where by nicking the duodenal end somewhat, the difference between the openings of duodenum and stomach was moderate and the two ends could be united by a circular suture, taking somewhat larger bites on the stomach side, which naturally became slightly puckered. The ulcerated carcinoma had penetrated toward the pancreas. With long shallow cuts the fibrotic bottom of the ulcer was removed together with the pyloric mass, going as deep as the fibrotic change would allow us, and avoiding opening the ulcer cavity, which would have meant soiling the wound. The resected area measured seven centimeters at the lesser curvature, but the shape of the stomach was such that the lumen was not too wide for a circular suture. Only the rim of the mass showed carcinoma, while the bottom was a plain ulcer. Ulceration had here apparently overtaken the neoplastic alteration or carcinoma had started secondarily at the edge of the ulcer. The operation was over ten years ago and the patient now feels entirely well.

When the gastric opening after resection is too large for this circular suture, it has to be reduced by closing it from the lesser curvature down. This causes a somewhat dangerous point, called angulus mortis, where it meets the circular gastro-duodenal suture. It requires especially good suturing and is best protected by an omental tag. In general the Billroth I operation, however, has the drawback that it may induce the surgeon not to make his resection sufficiently extensive and deliberate.

As experience makes one favor wide and extensive resection, therefore a Polya operation is the most handy for the average case. The upper half of the stomach wound is closed with a continuous suture, using only the lower half for the stoma; but the gut is sewed all the way up on the gastric wound and even a little beyond it on the lesser curvature. This adds security to the closure of the dangerous upper angle of the suture. It is of advantage to sew the gut to the posterior wall of the stomach before removing the portion containing the growth. In the cases where the remnant of the stomach retracts far up I have never hesitated to make an anterior Polya and have not had

reason to regret it. The operation is easier. If the typical Polya is made it is, of course, important to suture the rent in the mesocolon to the stomach far enough away from the emerging loop to avoid compression or kinking.

As to the suture, catgut as offered in the market for intestinal work with the needle fixed to the end of the thread is very convenient, but especially in dilapidated patients at least a few additional interrupted linens or silk sutures increase the feeling of security. It is well to remember that an intestinal suture, even silk suture, weakens the first days by a gradual cutting through of the threads and is weakest on the fifth day, from which date on the resistance to tension increases again in strength by the increase in the firmness of the union of the tissues. On the seventh day the union has reached the initial strength of the first day, and from then on rapidly becomes more resistant.

Sleeve resection of the stomach may at times be chosen when the growth is well confined to the midportion and the glands seem uninvolved. In two cases I had to add a resection of the transverse colon because the growth had invaded the mesocolon so much that large vessels were involved.

A somewhat difficult point is at times the closure of the duodenum. Linen or silk is best used here. There is no objection if it becomes necessary to strip off a few millimeters of pancreas, keeping in mind that only serosa-covered intestine agglutinates readily. Draining directly from the duodenal stump invites leakage. Draining should, therefore, be placed, when desired, to the side of the sutured area, preferably one inch away from it. I have practically never used such draining. An omental graft, if necessary a free graft, helps to protect against leakage.

You see in practically all textbooks when anterior gastro-enterostomy as in a Billroth II is described that an entero-anastomosis is advised. However, if you suture the jejunum for a distance to the stomach above the gastro-enterostomy opening and constrict the inlet somewhat by taking here wider bites as I described in the April, 1919, number of "Surgery, Gynecology and Obstetrics," you will not need the entero-anastomosis. The sutures are so placed that they pull the gut upward on the upper portion of the gastro-enterostomy opening which straightens the outlet. The alkaline duodenal juice reaches thus the gastro-enterostomy and therefore protects better against jejunal ulcer.

There will always remain the personal element of the surgeon himself. Each man has to know how far his individual ability will reach. He will also take into consideration the age of the patient. In a young person he will make the resection far outside the recognizable limits of the growth, while in an old one with a reduced life expectancy he will weigh the operative risks more exactly. There may present itself even an indication for a two-step operation when a pyloric stenosis of long standing has reduced the general condition to an undue degree. At the first stage a gastro-enterostomy is then made which will allow a marked improvement of the general resistance, and three to five weeks later the resection can be done. A reason-

able amount of x-ray treatment starting two weeks after the operation will perhaps counteract the drawback of the delay.

Gastro-enterostomy alone in carcinoma of the stomach is mostly a miserable operation which surgeons try to avoid, though an exceptional situation may force this procedure. It should then be preferably anterior and the mentioned hooking up of the inlet will avoid an enteroanastomosis. Against *anterior* gastro-enterostomy especially in ulcer cases there seems to be in many quarters a great aversion which is not very well justified. In fact it has a feature of advantage which I have never seen pointed out. While the suture of the posterior gastro-enterostomy lies at the bottom of the lake of acid gastric content, the anterior is suspended in the dome of the gastric air cushion. You know from your x-ray observations that the stomach always contains a respectable quantity of air. If one remembers the really great bulk of alkaline secretion coming from the duodenal side, one can imagine seeing it enter through the anterior-gastro-enterostomy opening in the dome of the air cushion in the recumbent patient. The insignificant amount of acid secretion from the neighboring gastric mucosa could in no way stand up against this almost constantly flowing alkaline well.

We come to the after-care. When I used nothing but silk in my earlier work, I had no more trouble with jejunal ulcer than later with catgut prepared for intestinal work; in fact it seems to me, I had less. One did have little fear of the reliability of the suture, while with a rapid absorption of the catgut the wound is too little resistant even if we wait a few days before starting to feed the patient. The catgut reaching through the mucosa is absorbed and a strong wave of even liquid food might cause the mucosa suture-line to part, which would be the entering wedge for the formation of an ulcer. However, in resection for carcinoma, this danger is insignificant.

Bleeding after the operation is more important and here Pancaro's sistosan seems to be of help. Pancaro himself had some apparently striking results in gastric bleeding. The preparation is made from vegetable material. The formula is not yet made public and the product is not yet on the market as Dr. Pancaro is waiting for more extensive clinical tests. But I am of the impression that we have here an agent which is of great value in capillary bleeding as well as in severer bleeding from larger vessels. A few weeks ago a patient of mine vomited some blood the day after a gastro-enterostomy. He then received three tablespoonfuls of sistosan. There was no more vomiting and the further course was quite smooth. What part the sistosan played is, of course, not sure. However, though I am still in the stage of testing the preparation, I feel that Dr. Pancaro has found something of great value. There does not occur any untoward progressive thrombosis in the vessels.

The insertion of a nasal suction tube after operation guards us from a blowing out of the suture line in case of undue accumulation of gas or liquids. Twice I remember having inserted the nasal tube before operation and having directed the lower end through

the gastro-jejunal opening for eight or ten inches down into the jejunum. In these cases we felt the need of prompt postoperative feeding, and in this manner avoided making a jejunostomy, which otherwise is very advisable in extensive resection, as feeding can be started promptly.

In anemic persons the administration of hydrochloric acid a couple of weeks after the operation, at first in small doses, often does much good for the general come-back of the patient. A colleague reported to me that in one of his cases calcium phosphate was given by his associate and severe intractable diarrhea persisted. Acid calcium phosphate is absorbed by the intestines. However, in the case mentioned the neutral calcium salt in the absence of hydrochloric acid formed soap with the fats (fatty acids) and the patient thus had the effect of soapsuds administration. Giving hydrochloric acid promptly stopped the diarrhea.

Let me emphasize that the diagnosis of carcinoma of the stomach is by no means a death warrant, and when you read (Am. Jour. Surg., Feb., 1936, p. 137) that: "Nearly all cases of gastric cancer result in death within a short time after diagnosis" you know that it may appear that way to the statistician, but that it really this picture is drawn far too black. In my comparatively small material are three patients who were well for over twenty years after resection. None of these, too, was an early case. They had, however, very little or no noticeable involvement of the lymph nodes though the tumor masses were in each case the size of a woman's fist.

The absence of an invasion, or let us say, the absence of a marked invasion of the lymphatics, therefore, is of foremost importance for a hopeful outlook. A most noteworthy observation on the necropsy material of an institution was detected by the late J. B. Murphy and emphasized properly by C. H. Mayo as of greatest value. It is well worth restating. In that institution over one hundred and fifty cases of cancer of the stomach had come to autopsy without operation. Twenty-five per cent of these cases had no wide-spread involvement of the lymphatics and, therefore, had died of a purely local disease, be this through cachexia, obstruction, bleeding, or perforation. You can at once see here the great chance for surgery. In recent years the carcinomas of the stomach are often divided into two main groups, which has much clinical justification. The one group is called the *fungating* type, the other the *infiltrating*. The first group contains the cases of bulky tumor masses with mostly a sharp macroscopic delimitation. The word "fungating" does not appear to me especially well chosen, inasmuch as it insinuates a spongy soft growth. However, the more spongy and soft the growths are the readier will they ulcerate and break down. A very soft, malignant growth is liable to be digested away almost completely, and then leaves an ulcer, little indicating its real nature. The characteristic bulky tumors are adenocarcinomas of mostly a low grade malignancy. They are well outlined. But we should not trust the outlying districts too much, as could well be seen in a case of mine. This patient free from recurrence died of apoplexy twenty-four years after resection of the stomach for

one of these bulky adenocarcinomatous tumors (Annals of Surgery, October, 1930). The resected specimen showed the tumor mass protruding greatly into the lumen of the stomach and was apparently well outlined. The resection had been made at a good distance from the growth. The tumor was situated at the lesser curvature near the pylorus, and, as you will see from the photograph of the specimen, the resection at the lesser curvature was made a good five centimeters distant from the edge of the growth. It seemed almost unnecessarily far away; only a small piece of stomach remained. Macroscopically the mucosa was normal to the very edge of the growth though the gastric wall was here a trifle thickened. Microscopically the carcinoma extended for two full centimeters in the mucosa, the secreting glands being of giant size and irregular shape. There were no metastases in the lymph nodes.

At the beginning of this short paper the early recognition of the growth was emphasized as the main factor for a hopeful outlook. This should always be put in first place even if it were only for its propagandist value. The patient must reach his surgeon as early as possible. But of equal or perhaps even more importance for a favorable outlook is the character of the neoplasm. Even an extensive bulky so-called fungating growth offers a considerably better chance for permanent recovery than a very much smaller one of the infiltrating kind.

Discussion

DR. O. W. WANGENSTEEN: It was a pleasure to have heard this interesting presentation by Dr. Arnold Schwyzer. We, of this medical community, are indebted to him on a number of scores and I for one count it a privilege to have come within the radius of his scholarly stimulation. May the impress which the brothers Schwyzer have left with us be long remembered!

To hear one speak from his own experience is to know that knowledge tempered with wisdom is being imparted to us. One who has occasion to consult medical texts for reference often has cause to hope that those who write would confine themselves to their own personal knowledge and experience. When this guide becomes more uniformly observed, many of the ancient errors copied from generation to generation will be corrected in our texts and from their pages many medical and surgical barnacles will be deleted.

The mortality of cancer of the stomach treated medically is 100 per cent. The results from surgery have not been too reassuring; yet, one can not help but feel somewhat depressed over the limitations of our art. Except for the cancers of the skin, what malignancies are there which should afford us real cause for elation over the results of treatment? When Billroth in 1890 discussed the surgical treatment of cancer of the stomach before the German surgical congress, he said that with improved surgical technic and better diagnostic methods, the results of treatment would be better. Roentgen diagnosis of stomach disorders has come and numerous improvements have occurred in the surgical technic, but there remains much to be desired in the treatment of cancer of the stomach. The operation is a formidable one and commands a respectable mortality and of the cases that survive operation, unfortunately the number which live and are free from disease for more than five years is not considerable. Yet, surgery is the only agency which holds out any promise for cancer of the stomach. The

results with x-ray or radium treatment have, in the main, been very disappointing. The most serious aspect of the problem, however, would appear to be that so large a number of cases are beyond any remedy when they come to the surgeon for relief. It is gratifying to know that Dr. Schwyzer had three cases of cancer of the stomach which long periods of observation proved to have been cured.

Dr. Schwyzer has properly stressed the x-ray as the most valuable agency in the early detection of cancer of the stomach. Yet, recent personal experiences in which cancers of the stomach have failed of detection in the hands of competent roentgenologists have suggested that even this method has its shortcomings. Recently Dr. George Fahr of the Minneapolis General Hospital asked me to operate upon a case of cancer of the cardia of the stomach which he and Dr. Arthur Kerkhof diagnosed by gastroscopy. Dr. Arthur Zierold, chief of the surgical staff of the Minneapolis General Hospital, knowing of my interest in lesions of the upper stomach, kindly permitted transfer of the patient to the University Hospital. Roentgen study of the stomach at the Minneapolis General Hospital as well as at the University Hospital failed to disclose a lesion. At operation an indurated area somewhat more than three inches in length and about two inches in width was found at the greater curvature—the center of the lesion being slightly above the points of juncture of the middle and upper third of the stomach. A subtotal excision was easily done and the patient made a very satisfactory recovery. The excised specimen revealed a small ulcer at about the middle of the indurated area; histologic examination of the specimen selected from many places in the indurated area all showed scirrhous carcinoma. Since then, Drs. Fahr and Kerkhof asked me to operate upon a second patient, who had been studied roentgenographically periodically over a period of three years without the finding of a lesion. At the University Hospital, just prior to operation, a definite filling defect was found high on the lesser curvature. Operation disclosed a lesion on the posterior wall; metastases were present and the lesion was already definitely inoperable.

That a number of cases with cancer of the stomach come with long histories is well known and I believe that there is as assuredly *acute* and *chronic* cancer as there is acute and chronic infection. I grant that perhaps the instances referred to above are somewhat unusual and that small lesions in the cardia, at the greater curvature, or on the posterior wall of the stomach are probably among the most difficult for the roentgenologist to detect. We all know how much superior cystoscopy is to the cystogram in the recognition of lesions of the bladder. To be certain, the analogy between direct visual examination and roentgenography of the bladder and stomach is not perhaps a particularly good one; yet, I am inclined to believe that gastroscopy may prove to be an agency of real merit in the earlier detection of cancer of the stomach. We all lament the late recognition of cancer of the stomach; it would be interesting to know in a series of inoperable cases of gastric carcinoma, how many of the group had received a roentgen diagnosis of "negative stomach" in competent hands in the preceding year. Earlier means of recognizing the presence of malignancy are still to be desired.

In the operative treatment my own inclination is to operate under general anesthesia, employing ethylene and ether. A duodenal tube is inserted prior to operation and small quantities of tenth normal hydrochloric acid are instilled at frequent intervals for a few hours preceding operation. The virtue of hydrochloric acid in keeping the empty normal stomach free from bacteria is well known. The operative procedure itself should be carried out with the most strict aseptic precautions—particular care being taken to obviate any contamination in the making of the anastomosis. The writer has found employment of 1 per cent sodium

ricinoleate satisfactory for this purpose. Constant suction is applied to the indwelling catheter for several days after operation—3,000 to 4,000 c.c. of 5 per cent glucose being given daily intravenously meanwhile.

I have just recently reviewed the University Hospital experience with cancer of the stomach. During the last thirty months thirteen gastric resections were done for malignancy by me; during this period there was one hospital death. Another of the group has since died of recurrence. Our criteria in operating for cancer of the stomach are essentially as detailed by Dr. Schwyzer: (1) that the general physical status of the patient warrants operation; (2) no distant metastases are present; (3) ascites is not demonstrable; (4) the lesion is resectable from an x-ray standpoint. The film made in the erect posture occasionally reveals normal gastric wall above the lesion when the film in the horizontal position would indicate that the lesion extends to the esophagus. Transfusion is an aid of great value in improving anemic patients for operation.

Dr. Schwyzer said that he had not considered carcinoma of the upper end of the stomach as an operable lesion. There have been occasions when I wished that I had been as prudent. I was unfortunate enough to have the first patient upon whom I did a total gastrectomy get well. Then I operated upon several additional ones, all of whom died. This experience has discouraged me considerably but I am still hopeful that some day an adequate operative procedure will be improvised to deal with these high lesions. Retraction of the esophagus after the esophago-jejunal anastomosis and infection are the obstacles to success.

DR. R. C. WEBB: This discussion of carcinoma of the stomach by Dr. Schwyzer has been most interesting and encouraging. I would like to add a further note of encouragement in the operative treatment of carcinoma of the stomach and to place on record the following case report of a carcinoma of the body of the uterus followed by carcinoma of the stomach. The patient, sixty-four years old, was the wife of a physician who first came to us in August, 1929, complaining of a watery, vaginal discharge. Symptoms began in 1927 with a blood tinged, watery discharge. Dr. Wynne curetted the patient, and the diagnosis by Dr. Floyd Grave was carcinoma of the body of the uterus. She was also suffering with a chronic diabetes. Radium treatments were given in the uterus with the assistance of Dr. C. R. Drake. The diabetes was treated by Dr. T. A. Peppard. In November, 1929, I assisted Dr. Wynne, and a panhysterectomy was performed at the Asbury Hospital. Carcinoma was still present in the body of the uterus.

The patient developed stomach symptoms, five years later, early in 1935 at the age of sixty-nine. She consulted Dr. T. A. Peppard, who made a complete study of the patient and referred her to Dr. R. G. Allison for gastro-intestinal examination. A diagnosis was made of carcinoma involving the pyloric end of the stomach and extending back on the greater curvature about four or five inches. The opinion was expressed that this lesion was probably resectable. In April, 1935, I explored the patient at the Northwestern Hospital and found a mass which began exactly at the pylorus and extended upward about one and one-half inches on the lesser curvature and about five inches on the greater curvature. I resected the distal three-fifths of the stomach, and performed an anterior Polya type gastroenterostomy and entero-anastomosis operation. She also had a cholelithiasis which was not treated. The pathological report by Dr. Margaret Smith was: carcinoma of the stomach. The patient is alive and apparently well at the age of seventy and over six years after removal of a carcinoma of the body of the uterus and one year after removal of a carcinoma of the stomach.

Dr. F. R. SEDGELEY (by invitation): After Dr. Wangenstein's very thorough discussion of Dr. Schwyzer's paper there is little urge to attempt to add to it.

A reference he made to lesions on the posterior surface, or greater curvature, however, prompts me to speak of our experience at the Veterans' Hospital during the past few years. This has led us to assume that any such lesions are malignant until proven otherwise.

The reason for this viewpoint has been emphasized very recently by a striking case. The patient came in with all of the symptoms of acute perforation of a peptic ulcer. The ulcer was on the greater curvature of the pars media. There was nothing about the lesion to arouse the slightest suspicion of malignancy. The ulcer was resected and routinely sent to the laboratory.

This patient made an unusually satisfactory and rapid recovery and left the hospital promptly. The following day a laboratory report was received which reported malignancy. If ever there was an early case, apparently this was one. With the expectation of an unusually early and favorable case, the patient was sent for, the situation explained to him, and he was reoperated, but already numerous lymph nodes were involved, and, although a radical resection was done, the downward progress was extremely rapid, and in spite of another excellent immediate postoperative recovery, his death occurred in a few months.

The point has been brought out that the nature of the lesion determines the prognosis in these cases. One cannot be sure of the lesions in the early case, even when they are in the hand. Why some of these patients live after operation when the condition is so extensive at the primary operation, even living for many years after having been classified inoperable with metastases at time of operation, and others pursue a rapidly fatal course when the size of the lesion and signs of malignancy are minimal, must be explained by the as yet unknown factors involving the essential nature of malignant disease.

Dr. A. A. ZIEROLD: I was too late to hear Dr. Schwyzer's paper and consequently can offer no pertinent comment. One question occurs to me: what most determines the end-result in carcinoma of the stomach, the nature of the growth or the nature of the surgical removal? My own experience would lead to the belief that little change in statistics of survival may be expected until more is learned of the early symptoms and appearance of carcinoma of the stomach.

I believe that we owe much to Dr. Schwyzer, not only for the high surgical standard which he has maintained in this vicinity, but for his generous contributions from his own experience.

Dr. H. A. H. BOUMAN: I have known Dr. Arnold Schwyzer more than forty years. He was prominent then. By simply "working each case and penetrating it with growing capacity" he has been a master many times. However, it is not the master so much as the personality, that we are so fond and proud of. In moral strength, ethical professionally, always helpful, he represents the hippocratic physician.

Alterius non est, qui suus esse potest.

Dr. O. A. WANGENSTEEN: The complaints of these two patients in which gastroscopy proved of more value than the x-ray in the diagnosis were essentially those of gastro-intestinal dysfunction, viz., abdominal pain and distress. Both patients were middle-aged; the first, a woman, had a shorter story, only of several months standing and had had occasional vomiting of blood. There had also been great weight loss. The second, a man, had suffered from abdominal distress for three years.

Having the privilege of the floor again, I should like to ask Dr. Schwyzer concerning his manner of

closure of the abdominal wall after gastric resection. We see evisceration more frequently after gastric resection for cancer than after any other abdominal operation. We have been meticulously careful in all matters relating to asepsis in wound care and have felt some pride in the rarity with which wound infection is observed. Recently, a patient eviscerated on the fifth day after operation and not a vestige of catgut was found in the wound; there was no evidence of infection. Fortunately, following mere strapping of the wound with adhesive tape (a long Penrose drain being placed between the edges of the skin) this unfortunate accident is usually well tolerated. The employment of suction obviates the occurrence of obstructive phenomena and this practice in dealing with evisceration we have found safer than resuture of the wound. Dr. Schwyzer made no mention of evisceration and I should like to hear whether this complication has given him any trouble. A number of surgeons doing gastric surgery who have interested themselves also in wound healing have informed me that they too have been troubled with the occurrence of evisceration after gastric resection for cancer.

Dr. CABOT: I am interested in what Dr. Wangenstein has said about evisceration. We have had this experience twice, though they occurred later, about the tenth or eleventh day.

Dr. Schwyzer was speaking about the anterior Polya, with the partial closure of the gastric stoma. I was wondering whether he noticed any undue angling of the upper arm, and if the Doctor ever felt the necessity of doing an entero-anastomosis.

Dr. ARNOLD SCHWYZER (closing): I thank you for your very kind discussion.

Talking about evisceration, as far as I remember we have not had any (except in a case of tuberculous peritonitis). In former years I always used linen or silk for the fascia, or straight through-and-through double silk suture, tied on both sides over rubbers or buttons and never removed them for at least thirteen days; often left them in until the sixteenth day. If, in a fleshy person, a wound is infected or if it is expected to become infected, a silk suture going in on the side and grasping the fascia by a double loop and going out onto the skin on the same side as entered is of advantage. You can then leave all the fatty subcutaneous tissue open if you want to and still have a firm closure.

Of perforations in carcinoma of the greater curvature or near it I have seen two cases. In one there was an acute perforation into the peritoneum. She died a year later of metastases in the liver. Another one perforated at operation while excising the growth from the abdominal walls, into which it had grown. Plugging the opening with one finger we resected the stomach. Three years later he had an accident and I am told a gastric fistula followed. He then died within a few months.

Dr. Wangenstein is quite right about the tumors on the greater curvature that may not show on the x-ray. X-ray is the best, but not infallible. With the lateral x-rays we often see a lesion on the posterior wall. You asked me a month ago to talk on carcinoma of the stomach and I had no time to look up all my cases, so could not say what the operative mortality was.

I remember at this moment a death which revealed an interesting condition. A carcinoma of the stomach had gone far in the mesocolon. A large artery was in intimate neighborhood to the growth. We resected the stomach and colon and made an end-to-end anastomosis for the latter. The man did well for seven days. At the end of the week he suddenly got weak and died. At autopsy the stomach part was perfectly all right. The colon on the right side was normal up to the very

suture line. The left side was gangrenous. It occurs in a rare case that the right colic artery furnishes the circulation for the whole left colon.

Let me use the time which is left to say a little more about the styptic fluid sistosan.

Dr. Pancaro, whom I know as an excellent and reliable student, a graduate of the University of Rome, and a former interne of St. Joseph's Hospital of Saint Paul, reported to me that in a demonstration at Ottawa, he cut the jugular vein and carotid artery of a dog and after compression with a sponge soaked with sistosan supplemented by additional similarly soaked sponges over it, had after ten minutes a complete hemostasis. The skin was sutured together after removing the sponges without further securing the vessels and the dog lived. At that time he confined himself to injuring half the lumen, but in a later experiment he severed the artery completely and stopped the tremendous bleeding in eight minutes. Upon my request this experiment was kindly repeated by Dr. Warner F. Bowers in the laboratory for experimental surgery of the University of Minnesota. The dog is living.

We have used the preparation in a little over forty cases of different kinds such as prostatectomies, amputations, et cetera. We made an amputation above the knee for senile gangrene. We didn't need a single ligature. Only for safety's sake I put a fine catgut around the large popliteal vessels (which were thrombosed). There was no bleeding. Then sistosan was used in persistent bleeding after tooth extraction. Dr. Livingstone, of Hudson, Wisconsin, had a man who came to him with persistent bleeding after such a tooth extraction. Dr. Livingstone had some sistosan and applied it. The bleeding stopped permanently. We further used it in uncomfortable oozing in abdominal or goiter work, etc. However, it is with me still in the experimental stage. Where we cannot apply pressure at the same time we should not expect too much. In one case of varix aneurysmaticus of the wrist where even sewing with a fine needle and thread gave very uncomfortable bleeding, sistosan was put on for about 40 seconds and the bleeding stopped. All my wounds where sistosan was used healed per primam.

Dr. Pancaro made numerous experiments to ascertain the manner of action of the sistosan and found

among other things (to mention only some which impressed me most) that:

1. It does not damage tissues in any way, as I could observe myself.

2. Given by mouth or in repeated small doses intravenously, it does not always reduce coagulation time, but reduces the bleeding time down to half.

3. Its effect is due to a stimulation of the excitatory action of the leukocytes which causes the giving off of prothrombin ferment, this action being different from any other known styptic.

4. Small veins, due to the collapse of their lumen are not quite as readily influenced by the sistosan as arteries.

5. In cases of hemorrhage from gastric or duodenal ulcer he reports arrest of the bleeding (as well as could be judged from the clinical course.)

6. He also reports results in hemoptysis, metrorrhagia, epistaxis, and in eighty-six cases after tonsillectomy.

7. What was of special interest to me, he reports a good result in a case of "very severe" postoperative hemorrhage from the epigastric artery due to wound infection and in twelve cases of fifth day hemorrhage. Such bleeding due to a septic melting down of the blocking thrombus is particularly vexatious and often requires a ligation at a more proximal place in the course of the artery.

I think there is something real in that substance. He prepares it from about one dozen different kinds of plants. The history is interesting. His father was a doctor in Italy, and also was a good botanist. When the son left for America, he gave him this preparation along in a powder form saying that sometime he would be glad to have it. A case came with a three days' bleeding after a tooth extraction and everybody having tried everything else, he thought of the powder his father had given him. It stopped the bleeding and he began to think more of the preparation, made an aseptic lotion of it and tested it out.

Following the scientific program a short executive meeting was held. The meeting was adjourned at 10:00 p. m.

E. A. REGNIER, M.D., *Secretary.*

The Doctor's Depression Burden

The American Medical Association has just ended its national convention at Kansas City, while the Minnesota Hospital Association has closed an annual gathering in St. Paul. Discussed repeatedly at the nation-wide assembly of physicians were various proposals for socialized medicine. Minnesota hospital administrators recognized, meanwhile, the problem represented by a growing shortage of registered nurses.

Despite the critical depression problem that has made collection of fees so difficult for doctors, the American Medical Association is not rushing into espousal of any socialized plan. Dean Upham of Ohio State's College of Medicine was chosen President, and his "platform" included strong advocacy of "keeping medical practice individualistic."

Acknowledging growth of plans to finance medical service for persons of low income, Dr. Upham says the national association is looking into all such proposals to determine if there is one that can be used on a bigger scale. "That will take a long time," he declares. "Meanwhile, physicians are taking care of the poor. They will not be neglected."

Government relief funds have, of course, helped vastly in providing needed medical care. But the doctor has borne more heavily than perhaps any other business or professional man the burden of the "border-line case." He has performed his humanitarian work, knowing often that he would never be paid, certain most of the time that he would have to wait for his money. If depression heroes are being sought, America's doctors amply qualify.—Editorial, *Minneapolis Journal*, May 21, 1936.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of April 8, 1936

THE regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club, on Wednesday evening, April 8, 1936. The meeting was called to order at 8 o'clock by the President, Dr. Thomas S. Roberts.

There were fifty-two members and four guests present.

Minutes of the March meeting were read and approved.

The scientific program followed.

SOME PRACTICAL APPLICATIONS OF ACOUSTICS IN MEDICINE

Illustrated by Sound Pictures and Slides

HORACE NEWHART, M.D.

and

HENRY E. HARTIG, Ph.D.†

(by invitation)

Minneapolis

Abstract of Dr. Newhart's Paper

Dr. Newhart's paper dealt with a consideration of some of the basic facts concerning sound as related to medical practice:

Sound plays an increasingly important rôle in medicine. We have accepted so casually the rapid growth in our knowledge of the properties and possible applications of sound that we are prone to overlook its rôle in relation to the etiology, diagnosis, prevention, treatment and amelioration of disease.

As introductory to the presentation of the excellent sound moving pictures* on (a) Sound Waves and Their Sources and (b) Fundamentals of Acoustics, made possible by the newly organized and very efficient Department of Visual Education of the University of Minnesota and the paper to be read by our guest speaker, Dr. Henry E. Hartig, of the Department of Electrical Engineering, reporting the results of an extensive investigation of commercial hearing aids, a brief consideration of some of the basic facts concerning sound as related to medical practice seems in order at this meeting.

1. A fundamental fact which as physicians we never should forget is the physiological factor of safety, by virtue of which man normally possesses an acuity of hearing materially greater than he needs to meet his ordinary requirements in civilized life. Thus a person can sustain a very considerable loss of hearing without noticeable inconvenience and without even being aware of his defect. Inspection of Table I shows how acute is our normal hearing and also how unsuit-

able is the human voice as a means for testing hearing acuity, especially in the detection of a slight, very often significant, hearing loss.

Table II shows the great variation in the audibility of the various components of articulate speech. It explains why a relatively slight degree of hearing loss, especially for the high tones, interferes with the correct interpretation of speech, the weaker consonant sounds becoming imperceptible while the more dynamic vowel sounds are still heard.

2. A second important principle often overlooked is that a tone or noise of given loudness masks or makes impossible of perception other simultaneously produced sounds which are of a less degree of loudness or intensity. In other words, a listener is made to have for the time a hearing loss equal to the loudness of the masking sound. (The standard unit employed to designate degrees of loudness, acuity of hearing and degrees of hearing loss is the decibel, abbreviated db.) This fact makes it all-important that any tests in order to be sufficiently delicate and accurate to disclose slight degrees of hearing impairment must be conducted in places relatively free from the interference both of external noises and those caused by reverberation from nearby reflecting surfaces.

3. One's hearing acuity is determined by the acuity of hearing of his better ear. Thus it not infrequently happens that a person may entirely overlook or ignore a considerable hearing loss in one ear. For this reason he often fails to seek medical aid when it might be most effective.

4. In testing the hearing of each ear separately by means of the conversational or the loud voice, the better ear, if it is normal or only moderately impaired, cannot be excluded by the customary expedient of plugging its canal with the finger tip. To exclude effectively the ear not being tested, it is necessary to use a noise-producing exclusion apparatus like that of Bárány. Neglect to observe this principle often leads to serious inaccuracy and may even result in death through failure to recognize sufficiently early the presence of a total deafness occurring in labyrinthine involvement.

The above are fundamentals of acoustics which every otologist and medical practitioner should never allow himself to forget.

In regard to sound as a cause of disease, it is well known that loud, sudden or prolonged tones or discordant sounds, or noises, not infrequently produce injury of the middle and inner ear, resulting in degenerative changes with definite loss of hearing acuity. Such cases are common in otologic practice.

The harmful effects of noises are by no means limited to the ear. Studies made decades ago and surveys recently conducted by noise abatement committees have proved that the noises prevailing in cities produce dele-

†Associate Professor of Electrical Engineering, University of Minnesota.

*The sound films shown were prepared by Erpi Consultants, Inc., for the University of Chicago, under the supervision of Prof. Harvey B. Lemon and Prof. Hermann I. Schlesinger of the University of Chicago, Dr. Harvey Fletcher of Bell Telephone Laboratories, and Dr. Donald MacKenzie of Electric Research Products, Inc.

PROCEEDINGS OF MINNESOTA ACADEMY OF MEDICINE

TABLE I. MAXIMUM DISTANCES IN A QUIET PLACE FREE FROM REFLECTIONS FOR INTERPRETING CALL NUMBERS BY PERSONS HAVING VARIOUS AMOUNTS OF HEARING LOSS†

Hearing Loss Sensation Units (db)	Average Whisper	Loud Whisper of pp Voice	mf Voice	ff Voice
0	39.5 ft.	222 ft.	1250 ft.	1 1/2 mi.
5	22.2 ft.	125 ft.	704 ft.	3950 ft.
10	12.5 ft.	70 ft.	395 ft.	2220 ft.
15	7.0 ft.	39.5 ft.	222 ft.	1250 ft.
20	4.0 ft.	22.2 ft.	125 ft.	704 ft.
25	2.2 ft.	12.5 ft.	70 ft.	395 ft.
30	15.0 in.	7.0 ft.	39.5 ft.	222 ft.
35	8.5 in.	4.0 ft.	22.2 ft.	125 ft.
40	4.7 in.	2.2 ft.	12.5 ft.	70 ft.
45	2.7 in.	15.0 in.	7.0 ft.	39.5 ft.
50	1.5 in.	8.5 in.	4.0 ft.	22.2 ft.
55	.8 in.	4.7 in.	2.2 ft.	12.5 ft.
60	.....	2.7 in.	15.0 in.	7.0 ft.
65	.....	1.5 in.	8.5 in.	4.0 ft.
70	.....	.8 in.	4.7 in.	2.2 ft.
75	.....	.....	2.7 in.	15.0 in.
80	.....	.....	1.5 in.	8.5 in.
85	.....	.....	.8 in.	4.7 in.
90	.....	.....	.....	2.7 in.
95	.....	.....	.....	1.5 in.
100	.....	.....	.....	.8 in.
110	.....	May be reached by speaking tube	.....	.....
115	.....	Totally deaf	.....	.....
120	.....	.....	.....	.....

TABLE II. RELATIVE PHONETIC POWERS OF THE FUNDAMENTAL SPEECH SOUNDS AS PRODUCED BY AN AVERAGE SPEAKER†

ó 680	û 310	ch 42	k 13
a 600	i 260	n 36	v 12
o 510	ë 220	j 23	th 11
á 490	r 210	zh 20	h 7
ô 470	l 100	z 16	d 7
u 460	sh 80	s 16	p 6
ä 370	ng 73	t 15	f 5
e 350	m 52	g 15	·k 1

terious effects on health. They cause retarded growth in infancy, loss of sleep, fatigue, irritability and various functional nervous and emotional disturbances. They produce lessened efficiency among pupils, teachers and those engaged in professional pursuits and cause lessened output by industrial workers. The noise levels in larger cities caused by surface, elevated and subway traffic, construction operations, unrestricted use of radio, whistles, bells, automobile horns, the voices of street vendors and scores of other unnecessary noises vary according to the density of population and many other conditions. They invade hospital, school and residential districts. The noise levels of different locations are shown in Figure 1, and range from 20 db to 90 or more db. Indoor noise levels are shown by Figure 2.

Many of our most valuable diagnostic procedures are based upon the correct interpretation of sound as in direct, stethoscopic, obstetric and percussion auscultation. Even the qualities of the patient's voice and his speech characteristics as judged by the trained ear of the physician often yield valuable diagnostic data. Such possible information is easily missed when the examination is conducted in a noisy place or if, unfortunately, the examiner has a hearing defect. The result of a serious interview between a patient and a most skillful internist, pediatricist or psychiatrist is often made unsatisfactory by distracting or interrupting noises.

The standards of modern otologic practice especially

†From H. Fletcher, Speech and Hearing. Van Nostrand, 1929.

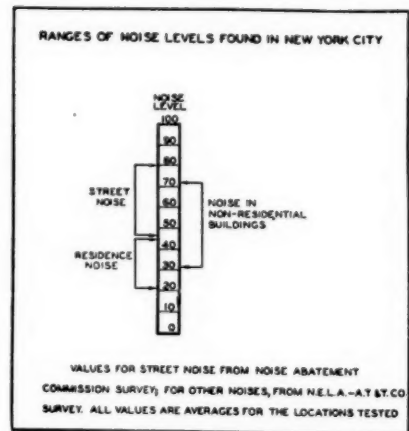


Fig. 1. From City Noise. Report of Noise Abatement Commission, Department of Health, New York City, 1930.

demand that hearing tests for the detection of a hearing loss and the determination of its degree and type be made in places free from interfering noises. For the otologist to attempt to test acuity of hearing in a noisy room is as absurdly inconsistent as it would be for the ophthalmologist to do a refraction in a room in which a cloud of smoke or mist partially obscures the test objects.

Not until recent years has the importance of the early detection of slight hearing loss been properly appreciated. In the young such a discovery indicates the probable presence of a significant hearing loss capable of causing in the school child retardation, speech defects or even an inferiority complex. If overlooked or neglected and the causes are not promptly sought and corrected, a seriously handicapping hearing defect may result sooner or later in life.

In adults, insidiously progressive degeneration of the cochlear apparatus is often first indicated by a loss of

PROCEEDINGS OF MINNESOTA ACADEMY OF MEDICINE

power to perceive the high tones. This condition is revealed only by a careful functional test. The discovery of such a loss demands prompt medical attention to disclose any causes requiring correction.

be not greater than five decibels and the intervals for pitch, if not continuous, in the frequencies from 200 to 4,000 cycles, should be in half octaves. A satisfactory standardized bone conduction receiver as well as a

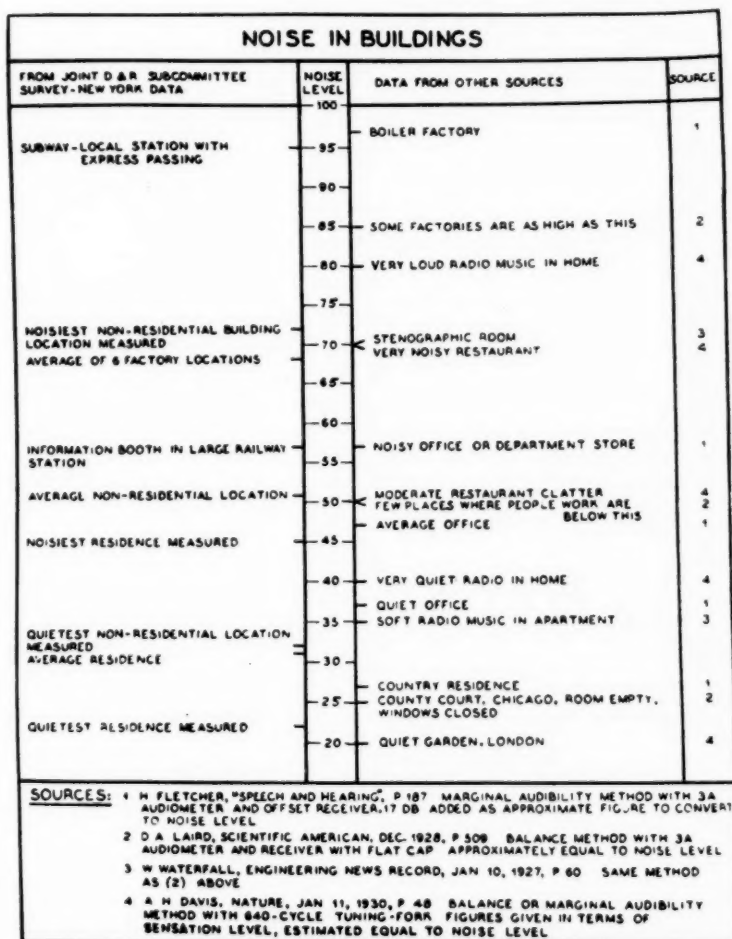


Fig. 2. From City Noise. Report of Noise Abatement Commission, Department of Health, New York City, 1930.

These facts emphatically indicate the wisdom of a regular, periodic, carefully made hearing test as a part of the individual health program at all ages.

It is the consensus of opinion of several hundred leading otologists that the most satisfactory means of accurately testing the hearing is by the use of a reliably constructed audiometer capable of producing pure tones free from harmonics, covering a frequency range from 64 or 128 to 8,192 double vibrations per second, and having an intensity range from ten decibels below the normal threshold of hearing to near the threshold of feeling. The intervals of graduated intensity should

high-grade air conduction receiver is now recognized as vitally essential for accurate determination of hearing loss and the prescription or selection of an electric hearing aid best suited to the needs of a person having a severe hearing loss.

There has been a growing, insistent demand for reliable audiometers at a reasonable price. Several manufacturers lately have promised to meet this need. Very recently a sub-committee of the Sectional Committee on Acoustical Measurement and Terminology of the American Standards Association, composed of acoustic engineers and otologists, has been appointed

to formulate minimum standards of performance for a satisfactory audiometer. As soon as these standard requirements shall have been made public and duly met by the manufacturers, standardized audiometers which will merit the approval of the Council on Phys-

electric hearing aids. These have been improved in their performance characteristics, reliability, inconspicuousness and appearance. They have a much wider range of application, being now successfully used by hard of hearing school children, both individually and

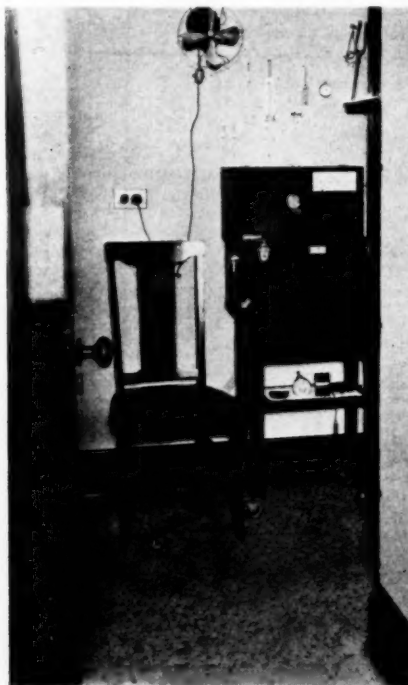


Fig. 3. Small, serviceable, acoustically treated ear testing room, 4'1"x7'9", with floating ceiling and heavily carpeted floor, in physician's office.

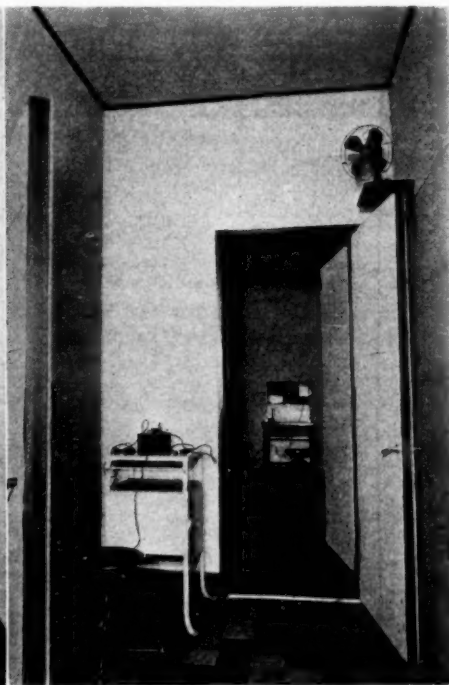


Fig. 4. Two connecting sound proofed ear testing rooms, each 5'6"x12', in University of Minnesota Hospital, Division of Otology. Ceilings and floor floated on sponge rubber. Double doors sealed with sponge rubber and equipped with refrigerator latches.

ical Therapy of the American Medical Association will be available. At such time and only when thus safeguarded, the audiometer should find widespread, satisfactory use among otologists, neurologists, general practitioners, school physicians, insurance examiners and the directors of the medical departments of railroads and other large employers of labor. Such a wide use of the audiometer will make possible larger and more successful efforts in the field of deafness prevention and amelioration.

Already the testing of large groups of school children by means of the phonograph audiometer to disclose those with a significant hearing loss has yielded excellent results in many communities.

Acoustic engineering recently has greatly increased the possibilities of ameliorating the condition of hundreds of thousands of persons afflicted with a handicapping hearing loss by making available more efficient

in class groups for instruction in correct speech and other subjects. Also, because of better performance, many adults who have been unable satisfactorily to use a hearing device now find great help in the newer hearing aids.

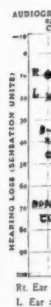
The physician, who is often consulted in regard to hearing aids, can be of great assistance to a patient in selecting the type of instrument best adapted to his individual requirements. In assuming this responsibility he should be guided by certain principles.

1. A person whose hearing loss in his better ear does not exceed forty decibels, as a rule, does better without a hearing device.

2. On the other hand, as soon as his loss reaches or exceeds forty decibels, he should be advised to secure promptly the hearing aid best suited to his requirements as determined by a careful otological examination, including an audiogram showing his hearing

loss
will
of sp
instru

Re
condu
which
of O



Audi
deter

Fig.
eter in
bone

great
mate
satisf
a com
of di
inter

The
better
is too
by an
of m
to de

Un
noises
physi
of re
his in
follow
ers,
hospi
ness
ciation
level

Any
and a
the m
media
sonal
he w
nostic
will
patier

JUNE

loss both by air and bone conduction. If he delays he will too often find it impossible to interpret in terms of speech the unfamiliar sounds he first hears with his instrument.

Recent investigations of commercial hearing aids conducted at the University of Minnesota, a report of which has been accepted for publication in the Archives of Otolaryngology, show that stock hearing aids differ

PERFORMANCE CHARACTERISTICS OF ELECTRICAL HEARING AIDS FOR THE DEAF

HENRY E. HARTIG, Ph.D.,
and
HORACE NEWHART, M.D.

Abstract of Dr. Hartig's Paper

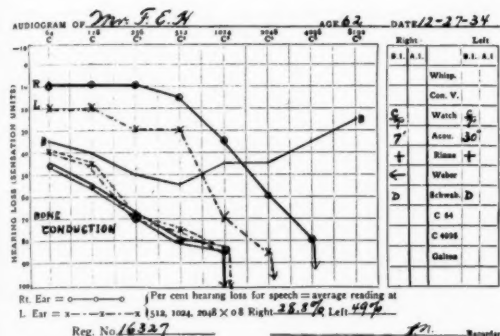
The common practice of relying entirely upon measurements of a person's threshold of hearing as a criterion of hearing loss is criticized as inadequate. It is suggested that since an auditor listens to speech, not at the threshold of hearing but at much higher loudness levels, threshold tests are made to bear too heavy a burden when the entire responsibility for measuring hearing loss is placed upon them. The necessity is pointed out for an audiometric study of the equal loudness levels of persons having hearing defects, extending from the threshold of hearing to normal hearing intensities. Sound amplification for hearing loss correction on a frequency selective basis is considered and it is concluded that present knowledge does not warrant acceptance of the theory but rather points toward the necessity for further study. The older uniform amplification ideal is examined, especially with reference to the ability of commercial portable carbon microphone hearing aids to satisfy the ideal. After a preliminary investigation of commercial hearing aids, in which the less effective or worthless devices were eliminated, an extensive series of tests was conducted upon four stock hearing aid models of popular make.

It was found that none of the four closely approached the ideal of uniform amplification. Articulation and sentence intelligibility tests showed that the four models differed very greatly in their speech transmission characteristics, varying from excellent to poor. In amplifying power also, the differences were considerable but not excessive. Methods for investigating the causes of poor transmission characteristics indicate the defect to be associated with wave form distortion which has the effect of introducing extraneous noises in the speech output.

The differences in performance were not found to depend measurably on differences in uniformity of response. In consequence, it is concluded that furnishing frequency response curves to the otologist with each hearing aid would be of no value. Of greater importance is a wide range of response (as a minimum, 200 to 3,000 cycles per second), freedom from singular amplification peaks, and sufficient amplification. Of paramount importance is the actual aid the user obtains in interpreting speech sounds and sentences correctly.

A method is suggested which enables the otologist, by means of a tapered horn, to listen directly to the sound output of a hearing aid. While the method is not free from objection, it should serve to enable the otologist to eliminate from consideration some of the worst of the commercial carbon microphone hearing aids now being offered to the hard of hearing public.

An attempt was made to devise a rational test for



Audiogram of hearing loss for air and bone conduction, useful in determining most satisfactory type of hearing aid required

Fig. 5. Audiogram made with Western Electric 2-A audiometer in acoustically treated room. Line B-B is graph for normal bone conduction of right and left ear respectively

greatly in their performance characteristics. The ultimate proof that an individual has selected the most satisfactory instrument will be found only by making a comparative intelligibility test of several instruments of different manufacturers, uninfluenced by any one interested in the sale of a hearing device.

The problem of noise abatement as a measure for better hearing, increased health and greater efficiency is too large to be solved in a short time. United action by an aroused, enlightened public under the leadership of medical men and physicists is accomplishing much to decrease unnecessary noise in some American cities.

Until the movement for doing away with unnecessary noises shall have achieved widespread results, every physician can successfully meet his individual problem of reducing to a practical minimum the noise level of his immediate surroundings. To do so he need only follow the example of the more progressive shopkeepers, restaurant and hotel managers, theater owners, hospital superintendents and managers of large business offices. These have already shown a keen appreciation of the many advantages of reducing the noise level in their places of business.

Any physician, with the help of an acoustic engineer and a carpenter, at a relatively small cost can eliminate the most objectionable interfering noises from his immediate environment and thus add greatly to his personal efficiency and increase his joy in his work. Thus he will attain greater accuracy in his exacting diagnostic efforts, especially in making hearing tests, and will add materially to the ease and confidence of his patients.

bone conduction oscillators but no wholly satisfactory procedure was found. By transmitting the vibratory oscillator output through a heavy leather belt to an electrical phonograph reproducer, the amplified electrical output of which in turn was converted to sound, intelligibility tests were conducted. These tests confirmed the estimate of relative merit of the four hearing aids as previously determined by the use of the air conduction receivers.

The President expressed the appreciation of the members of the Academy to Professor Hartig and Dr. Newhart for this very interesting program.

The meeting adjourned.

R. T. LA VAKE, M.D., *Secretary.*

Nonspecific Protein Treatment

In *The Journal A. M. A.*, November 30, 1935, p. 1765, appears the first of two special articles on nonspecific protein treatment, prepared under the auspices of the Council on Pharmacy and Chemistry. In this article Dr. Hektoen discusses briefly the nature of the reactions to nonspecific proteins in the treatment of infectious diseases. In *The Journal A. M. A.* for December 7, Dr. Cecil will review experiences and results with this treatment; he shows that modern protein treatment appears to have achieved "a permanent place for itself in modern therapeutics," not only of certain acute and subacute infectious diseases but also in other conditions, notably thrombo-angiitis obliterans. Both articles point out that the effects of nonspecific proteins in infectious conditions are associated with nonspecific as well as specific anti-infectious processes. It is evident that much more study of the changes induced by nonspecific proteins in the human body is required in order to obtain more of an insight into the nature and significance of these processes as they occur under various conditions. From Cecil's review it appears further that the indications, contraindications and limitations of nonspecific protein treatment in its present forms are well under way toward fairly definite establishment. Certainly the indiscriminate and offhand use of the treatment is unwarranted and not free from danger.—(*J. A. M. A.*, November 30, 1935, p. 1776.)

Lactobacillus Acidophilus Milk (Towt) Omitted from N.N.R.

Lactobacillus Acidophilus Milk (Towt), prepared by Towt-Nolan Laboratory, was accepted by the Council on Pharmacy and Chemistry in 1927. At the expiration of the period for which the product was accepted, a number of objections to labels, circulars, and miscellaneous advertising matter were reported. At that time the firm expressed its intention to cooperate at all times but asked that the Council grant a period of six months in which to use up a supply of material that was on hand. The council acceded to this request. When this period had expired, the firm failed to reply to the Council's request that the necessary revised material be submitted; two reminders were likewise ignored. Since the firm failed to submit evidence of its continued acceptability, the Council voted to omit Lactobacillus Acidophilus Milk (Towt) from New and Non-official Remedies. (*J. A. M. A.*, April 4, 1936, p. 1165.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

MEDICAL PAPERS DEDICATED TO HENRY ASBURY CHRISTIAN. From his Present and Past Associates and House Officers at the Peter Bent Brigham Hospital, Boston, Mass. 1,000 pages. Illus. Cloth binding. Baltimore, Md.: Waverly Press, 1936.

THE TECHNIQUE OF CONTRACEPTION. Third Edition. By Eric M. Matsner, M.D. Foreword by Robert L. Dickinson, M.D. Introduction by Foster Kennedy, M.D. 40 pages. Illus. Price, paper cover, 50c. Baltimore: Williams & Wilkins Co., 1936.

PASSIVE VASCULAR EXERCISES. Louis G. Hermann, A.B., M.D., Assistant Professor of Surgery, College of Medicine of University of Cincinnati and the Cincinnati General Hospital, etc. 288 pages. Illus. Price, cloth, \$4.00. Philadelphia: J. B. Lippincott Co., 1936.

GLANDULAR PHYSIOLOGY AND THERAPY. A symposium prepared under the auspices of the Council on Pharmacy and Chemistry of the American Medical Association. Chicago: Amer. Med. Ass'n., 1935.

It has been indeed a pleasure to review this book. The individual authors have made these chapters complete as to subject matter, omitting things that would tend to lead one onto borderline subjects.

The subject matter is presented precisely and made clear enough so that anyone with an understanding of the fundamentals of physiology will get a good deal out of reading the book.

The second thing that makes this book worth-while in anyone's library is the fact that the indexing is very complete, making this volume a very handy and complete asset to anyone no matter in what field of medicine he may be practising.

BASAL METABOLISM IN HEALTH AND DISEASE. Eugene F. DuBois, M.D., Medical Director, Russell Sage Institute of Pathology, Professor of Medicine, Cornell University Medical College. 3rd ed. 494 pages. Illus. Price \$5.00. Philadelphia: Lea & Febiger, 1936.

This third edition has brought up to date the significant data on basal metabolism. The author has correlated basal metabolism with clinical medicine and covers the underlying physiologic principles effectively for the practicing physician and student.

The chapters dealing with normal standards and surface area have been rewritten in view of recent contributions and a new chapter dealing with physical channels of heat loss has been added. Many new references concerning the basal metabolism in disease have been added.

The chapter on evaluation of results of basal metabolism tests should be read by all those interested in the clinical interpretation of the estimations obtained.

C. A. McKINLAY, M.D.